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APPENDIX H: SCREENING-LEVEL ANALYSIS OF POTENTIAL FOR ECONOMIC AND SOCIAL IMPACTS

The Chesapeake Bay Program (CBP) is developing revised water quality criteria, designated uses, and boundaries for those uses in the bay and its tidal waters, as well as a use attainability analysis (UAA) to support these changes. Among the factors that the CBP is evaluating as part of the UAA is whether pollution controls more stringent than those required under Sections 301(b)(1)(A) and (B) and Section 306 of the Clean Water Act would result in substantial and widespread social and economic hardship in the Bay watershed.

Given the size of the regional economy—$1.4 trillion in personal income in 1999 in the 6 States and the District of Columbia that are wholly or partially located in the watershed, of which $573 billion comes from watershed counties—net impacts over this area are not likely to be seen. For example, gross regional product in the State of Maryland is forecast to grow by 37% by 2010, corresponding to 19% growth in employment and 17% growth in real disposable personal income (see Appendix G). The Minnesota Implan Group's economic impact model, described in Appendix G, indicates that the Tier 3 scenario would result in a net increase in output and employment over this baseline level of growth. The increased economic benefits result from increased spending in high wage industries (e.g., wastewater treatment) as well as an influx of funds for pollution controls (e.g., Federal cost shares for agricultural best management practices); not included are additional market benefits likely to result from improved water quality (e.g., commercial and recreational fishing industries). Therefore, the regional economy is forecast to benefit from the tier scenarios.

The estimated annual cost of Tier 3 for 2010 populations ($1.1 billion in 2001 dollars) represents 0.2% of personal income in the Bay counties in 1999. Even if all capital costs ($7.7 billion) for this scenario were incurred in one year, they represent only 1.3% of personal income in the Bay counties in 1999. Although these data indicate that the pollution controls specified in the tier scenarios will not result in substantial and widespread social and economic hardship, there may be localized areas that need funding priority. In addition, variances can also be used, under certain limited circumstances, at the local level to mitigate substantial and widespread impacts where funding is not available. However, the detailed financial data for municipalities and private businesses required to evaluate needs and impacts in the numerous localities across the watershed is time consuming and costly to collect. Therefore, the CBP pursued a screening analysis approach using readily available information from national data sources to assist States in focusing any additional data collection or analysis efforts. This appendix discusses this screening level analysis and what it indicates (and doesn't indicate) across the basin.

This appendix is organized as follows. Section 1 provides an overview of EPA guidance for conducting analyses of substantial and widespread impacts. Then, within this context, Section 2 describes the purpose of the screening analysis. Sections 3 through 9 describe the screening variables, and results by sector. In each of these sections, an example of a more comprehensive analysis for one county is provided as groundtruthing for the screening results, as well as for illustration of what an actual analysis of substantial and widespread impacts would consider.

Section 10 provides a summary of the results. Attachments provide detailed formulas, additional maps, and variable values by county.

1. OVERVIEW OF EPA (1995) GUIDANCE FOR ECONOMIC ANALYSES OF WATER QUALITY STANDARDS

EPA (1995) provides guidance for evaluating whether substantial and widespread social and economic impacts will result from water quality standards. The economic impacts considered are those that result from treatment beyond that required by technology-based regulations. Since water quality cannot be lower than that resulting from technology-based limits for direct and indirect point source discharges, and reasonable Best Management Practices (BMP) for nonpoint sources, these controls are considered to be the baseline. All economic impact analyses of water quality standards should, therefore, address only the incremental cost of improving the water to meet fishable/swimmable uses (EPA, 1995).

EPA identifies specific tests of substantial impact, depending on whether the affected discharger is a public or private entity. For the public sector, there is a two part test. The first part of the test, called the Municipal Preliminary Screener (MPS), is a screening level ratio designed to trigger additional tests or screen out the possibility of substantial impacts. Since municipalities will pass all unfunded costs on to households, this screening is based on how household costs compare to household income. The second part of the test involves calculation of multiple indicators (e.g., bond rating, debt ratio, and tax collection ratio) designed to characterize the financial health of the community. Then, these two test results are evaluated jointly. EPA's tests for substantial impacts for the public sector are described in detail in Section 3.

For the private sector, the primary test of substantial impacts is how control costs affect profits. Then, several secondary tests or indicators (e.g., liquidity and solvency ratios) are used to further characterize whether the entity will bear a substantial financial impact. Tests of substantial impact for the private sector are described in detail in Section 4.

Then, if public or private entities will bear substantial financial impacts, the analysis proceeds to evaluation of whether there will also be an adverse impact on the community. This step involves estimating socioeconomic changes due to pollution control costs (e.g., loss of employment, changes in property values, and higher taxes), and considering the indirect economic multiplier effect. In particular, the analysis must consider how expenditures on compliance costs affect the community in addition to the how the financial impacts affect the community. Expenditures on pollution control costs will not vanish from the community. In reality, these expenditures become business revenues and household incomes that can offset adverse financial impacts experienced by the affected entities. (Appendix G describes the results of regional modeling of these expenditure impacts for one State in the watershed.)

The best approach for evaluating socioeconomic impacts is to model the impact of incremental control costs using a regional economic model. This approach involves developing baseline (i.e., without control costs) and policy (i.e., with control costs) scenarios to identify the incremental impact of meeting water quality standards. Differences in the model outputs across the scenarios

provide a forecast of the changes in population, income, sector employment, wage rates, and other economic variables that are attributable to the meeting the standards.

2. OVERVIEW OF SCREENING ANALYSIS

As described above, EPA (1995) guidance for evaluating whether controls beyond that required by technology-based regulations (considered the baseline) will result in substantial and widespread social and economic impacts requires **multiple** analyses. These analyses are designed to determine whether costs to meet water quality standards will have a substantial financial impact on those responsible for paying the costs, **and** an adverse impact on the community (i.e., a widespread impact). Conducting a complete substantial and widespread impact analysis for each of the 197 counties and independent cities in the watershed would be time consuming and costly. Therefore, the CBP developed a screening analysis to identify where county-level costs or economic conditions have no potential to meet EPA's criteria for substantial and widespread social and economic impacts. These areas can be excluded from further analysis, and attention can be focused on evaluating costs in the remaining areas to determine whether they cause substantial and widespread impacts locally.

That is, the CBP did not perform analyses of substantial and widespread impact for all 197 counties and independent cites, but instead constructed variables that would provide indication of whether or not both impact conditions could be met (see **Exhibit H-1**). The intent of the analysis is to conservatively (i.e., err on the side of not excluding a county if potential for substantial and widespread impacts exists) evaluate the potential for at least one impact condition, so that areas that do not have potential for either substantial or widespread impacts can be ruled out. If the potential for one impact can be ruled out, data collection and analysis to evaluate the second condition would not be necessary since the area could not meet both conditions.

The constructed screening model variables for some sectors indicate when controls costs are small relative to household incomes and, therefore, unlikely to meet EPA conditions for substantial impacts. Variables for other sectors indicate whether they are small relative to the local economy and, therefore, unlikely to meet EPA conditions for widespread impacts. Whether the screening variables for a particular sector address potential for substantial or widespread impacts depends on the availability of data; for agriculture, the CBP was able to construct screening variables for both and evaluate them jointly. Readily available data used in the screening analysis include statistics from the Census Bureau's 2000 Census of Population, the Bureau of Economic Analysis' 1999 Regional Economic Income System, the Department of Agriculture's 1997 Agricultural Census, and the CBP's 2010 population and land use projections.

The results show that most counties are unlikely to meet one impact condition or the other as a result of implementing the tier scenarios and, therefore, are unlikely to have substantial and widespread impacts. Screening analysis results for the remaining counties, however, do not imply that there will be substantial and/or widespread impacts; they only mean that the possibility cannot be ruled out by the screening analysis. A complete substantial and widespread analysis following EPA (1995) guidance must be conducted before making a determination.

Exhibit H-1: Summary of Private and Public Sector Tests for Substantial and Widespread Impacts and the Screening Variables Constructed for the Tier Scenarios

Sector	EPA (1995) Tests		Screening Variables for the Tier Scenarios[1]	
	Substantial	Widespread	Substantial	Widespread
POTWs (public)	Verify project costs. Two-part test consisting of: 1. MPS Screener[2] and, if MPS greater than 1%, 2. Secondary Test (consisting of scores for six indicators: a. bond rating b. net debt/full market value of taxable property c. comparison of unemployment rate to national average d. comparison of MHI to national average e. property tax revenues/full market value of taxable property f. property tax collection rate) with 1& 2 scored jointly.	Estimated change from precompliance conditions in socioeconomic indicators (MHI, unemployment rate, overall net debt/full market value of taxable property, percent households below poverty line, impact on community development potential, impact on property values).	Screening-level MPS[2] (e.g., calculated assuming 100% of flow is residential, no funding sources in several states).	None
Industrial (private)	Verify project costs. Primary Measure: Impact of Project Costs on Profit. Secondary Measures: Liquidity, Solvency, Leverage.	Impact on affected community (comparison of unemployment rate to national average, unemployment rate in community after compliance, MHI, percent of households below poverty line, change in expenditures on social services in affected community, percent of tax revenues paid by affected entity, State unemployment rate after compliance, change in State expenditures on social services).	None	Earnings from discharger category (at 2-digit SIC level) as percent of total earnings.
Forestry (private)	Verify project costs. Primary Measure: Impact of Project Costs on Profit. Secondary Measures: Liquidity, Solvency, Leverage.	Impact on affected community (comparison of unemployment rate to national average, unemployment rate in community after compliance, MHI, percent of households below poverty line, change in expenditures on social services in affected community, percent of tax revenues paid by affected entity, State unemployment rate after compliance, change in State expenditures on social services).	None	Earnings from forestry and logging as percent of total earnings.

Exhibit H-1: Summary of Private and Public Sector Tests for Substantial and Widespread Impacts and the Screening Variables Constructed for the Tier Scenarios

Sector	EPA (1995) Tests		Screening Variables for the Tier Scenarios[1]	
	Substantial	Widespread	Substantial	Widespread
Agriculture (private)	Verify project costs. Primary Measure: Impact of Project Costs on Profit. Secondary Measures: Liquidity, Solvency, Leverage.	Impact on affected community (comparison of unemployment rate to national average, unemployment rate in community after compliance, MHI, percent of households below poverty line, change in expenditures on social services in affected community, percent of tax revenues paid by affected entity, State unemployment rate after compliance, change in State expenditures on social services).	Screening level estimates of: 1. Average BMP costs/NCR 2. Crop plus portion of hay BMP costs/crop plus hay sales 3. Livestock plus portion of hay BMP costs/livestock sales 4. Average BMP costs/MHI.	Earnings from agriculture, agriculture services, food and kindred products, and tobacco sectors as percent of total earnings.
Urban (public)	Verify project costs. Two-part test consisting of: 1. MPS Screener[2] and, if MPS greater than 1%, 2. Secondary Test (consisting of scores for six indicators: a. bond rating b. net debt/full market value of taxable property c. comparison of unemployment rate to national average d. comparison of MHI to national average e. property tax revenues/full market value of taxable property f. property tax collection rate) with 1& 2 scored jointly.	Estimated change from precompliance conditions in socioeconomic indicators (MHI, unemployment rate, overall net debt/full market value of taxable property, percent households below poverty line, impact on community development potential, impact on property values).	Screening-level MPS[2] (e.g., calculated assuming no funding assistance).	None
Onsite (public)	Not specific (household waste management systems not funded by municipalities).	Not specific (household waste management systems not funded by municipalities).	Screening-level MPS (e.g., calculated assuming no financial assistance).	Percent of households affected.

Exhibit H-1: Summary of Private and Public Sector Tests for Substantial and Widespread Impacts and the Screening Variables Constructed for the Tier Scenarios

Sector	EPA (1995) Tests		Screening Variables for the Tier Scenarios[1]	
	Substantial	Widespread	Substantial	Widespread
POTW plus urban (public)	Verify project costs. Two-part test consisting of: 1. MPS Screener[2] and, if MPS greater than 1%, 2. Secondary Test (consisting of scores for six indicators: a. bond rating b. net debt/full market value of taxable property c. comparison of unemployment rate to national average d. comparison of MHI to national average e. property tax revenues/full market value of taxable property f. property tax collection rate) with 1& 2 scored jointly.	Estimated change from precompliance conditions in socioeconomic indicators (MHI, unemployment rate, overall net debt/full market value of taxable property, percent households below poverty line, impact on community development potential, impact on property values).	Screening-level MPS[2] (e.g., calculated assuming 100% of flow is residential, no funding sources for POTW projects in several states, and no funding assistance for urban BMPS).	None

BMP = Best management practices.
MHI = Median household income.
MPS = Municipal Preliminary Screener (defined as incremental household control costs plus existing household sewer rate divided by median household income).
MHI = Median household income.
NCR = net cash return.
1. County-level variables. See Attachment 1 for calculation of screening variables.
2. Defined as total annual sewer rate (current rate plus new costs per household) divided by MHI.

For example, financial data to determine whether substantial impacts would result from controls on industrial dischargers could be difficult to collect (particularly for privately-owned firms). [Under EPA (1995) guidance, the discharger would have to supply the data (and conduct the tests) to apply for a variance.] However, analysis of these impacts would not be necessary if any substantial impacts are unlikely to adversely affect the community (e.g., because the discharger accounts for a relatively small percent of the local economy). Therefore, the screening variable for industrial dischargers is designed to indicate whether widespread impacts are possible: it is defined as the earnings in the area attributed to the industrial category of the discharger as a percent of all earnings in the area. Relatively small values for this screening variable would indicate that the discharger is unlikely to adversely affect the community even in the extreme condition that control costs forced it to shut down. However, relatively high values for this variable are inconclusive because there may be multiple employers in the same industrial category that are not affected by the tier scenarios (data availability prevent greater disaggregation of industrial categories for this analysis). Also, high values may mean large industries for which control costs can be easily borne (i.e., they would not face substantial

impacts and so there would be no adverse impacts on the community even if they do represent a large sector of the economy).

Another area of great uncertainty in the results is funding. Under EPA (1995) guidance, sources of funding (e.g., Federal and State grants and cost-share funds) must be considered in making a determination of substantial and widespread impacts. For example, the CBP compiled all available information on current agricultural cost share amounts for each State. However, due to the large number of programs and sources across States, this information may be incomplete. In addition, these existing funding levels do not incorporate the 2002 Farm Bill. The 2002 Farm Bill increases Federal conservation funding by 80% above the level committed by the last (1996) farm bill, including programs for BMPs included in the tier scenarios. The new law also permits a greater percentage of BMP installation costs (90%, up from 75% in the 1996 bill) to be granted to limited-resource farmers under the Environmental Quality Incentives Program. Although the bill includes funding for new conservation programs, it does not include direct funding for a proposed Nutrient Reduction Pilot Program in the Chesapeake Bay watershed. This is the demonstration program for the yield reserve BMP in the tier scenarios. Nevertheless, the program may be funded under an innovative technologies clause (personal communication with T. Simpson, Chair, CBP Nutrient Subcommittee, May 2002). If implemented, this cost-share program could result in annual incentive payments of $20 to $40 per acre. Funding for this program alone would reduce the agricultural costs borne by farmers in Tier 3 by $25 million to $50 million per year. Therefore, costs paid by farmers may be lower than those used in the screening analysis, and impacts may be overstated.

Therefore, the results of the screening analysis are very limited. In general, screening analysis is used to rule out areas for further research because such analysis would not be worthwhile. In taking this approach, the CBP designed its analysis to avoid ruling out areas that could have impacts. Therefore, true to this design, the potential for impacts is likely overstated. Nonetheless, as a first step, States can use the results to direct funding or additional analysis to counties or sectors that cannot be ruled out at this stage.

3. POTWs

As described in Appendix E, control costs for POTWs consist of annualized capital plus O&M costs for nutrient reduction technologies (NRT). Municipalities will pass costs not funded by assistance grants on to residential and nonresidential customers in the form of increased sewer fees.

As described above, EPA (1995) guidance provides preliminary and secondary tests of whether such costs would result in substantial impacts on the public sector (the preliminary test acts as a trigger for performing the additional, more data intensive secondary test), and a list of variables to evaluate to determine if such impacts will also be widespread. Data and methods for determining if impacts will be widespread are complex, and best accomplished with regional economic models (similar to those mentioned above). Data to conduct the secondary test of substantial impact would also be difficult to collect Bay-wide, however, information for EPA's preliminary test is more readily available. Therefore, this test can be performed as a first step in focusing additional analysis so that resources are not devoted to data collection for areas that clearly will not face any substantial impacts.

3.1 Tests of Substantial and Widespread Impact

EPA (1995) guidance provides a two-step test of **substantial** impact applicable to the POTW sector. The fist part is to calculate the Municipal Preliminary Screener, or MPS. Calculating the MPS involves the following steps.

1. Evaluate the appropriateness and the cost-effectiveness of the proposed project. Public entities should consider a broad range of discharge management options including pollution prevention, end-of-pipe treatment, and upgrades or additions to existing treatment. The project costs should be specific to attaining the water quality criteria; that is, the costs cannot include the costs of capacity expansion or other growth-related expenditures that would occur anyway.

2. Calculate new annualized pollution control costs.

3. Calculate new annualized costs per household and add to existing sewer rate.

4. Calculate the MPS:

$$\text{MPS} = \frac{\text{Average Total Pollution Control Cost per Household (i.e., new costs plus current sewer rate)}}{\text{Median Household Income (Adjusted for Current Year)}} \times 100$$

5. Evaluate the MPS as follows:

- If MPS < 1.0% of Median Household Income (MHI), no substantial economic hardship (undue financial burden) expected

- If MPS > 1.0% of MHI, conduct secondary test.

Exhibit H-2 provides benchmarks for comparison of the MPS.

Exhibit H-2: MPS Screener Benchmarks

Screener Value	Level of Impact	Conclusion
< 1% of MHI	Little	No impacts expected
1%–2% of MHI	Midrange	Conduct secondary test
> 2% of MHI	Large	Conduct secondary test

Source: U.S. EPA (1995).

The second part is a secondary test that builds upon the characterization of financial burden identified in calculating the MPS. The test is designed to provide indication of a community's ability to obtain financing and describe the socioeconomic health of the community through analysis of:

- Debt indicators
- Socioeconomic indicators
- Financial management indicators.

Specifically, applicants are required to evaluate (score) six indicators for the community:

1. Bond rating
2. Overall net debt as a percent of full market value of taxable property
3. Unemployment rate
4. MHI
5. Property tax revenue as percent of full market value of taxable property
6. Property tax collection rate.

These secondary indicators provide a composite assessment of the community's economic health and the financial impact of the pollution control project. For each of the six indicators the community is rated as weak, mid-range, or strong based on certain thresholds. The secondary indicators are evaluated to develop a secondary score, as shown in **Exhibit H-3**. The secondary score is then evaluated jointly with the MPS value (**Exhibit H-4**).

The matrix in Exhibit H-4 illustrates how the MPS and the Secondary Score are used together to assess the potential for substantial impacts in the jurisdiction. The closer the jurisdiction is to the lower left corner of the matrix (i.e., the lower the MPS and the higher the Secondary Score), the smaller the financial impact is likely to be. Conversely, a rating closer to the upper right corner of the matrix (i.e., a higher MPS and a lower Secondary Score), the greater the likelihood.

Exhibit H-3: Secondary Indicator Thresholds

Indicator	Weak (score = 1)	Mid-Range (score = 2)	Strong (score = 3)
Bond Rating	Below BBB (S&P) Below Baa (Moody's)	BBB (S&P) Baa (Moody's)	Above BBB (S&P) or Baa (Moody's)
Overall Net Debt as Percent of Full Market Value of Taxable Property	Above 5%	2%–5%	Below 2%
Unemployment	More than 1% above National Average	National Average	More than 1% below National Average
Median Household Income	More than 10% below State median	State median	More than 10% above State median
Property Tax Revenues as Percent of Full Market Value of Taxable Property	Above 4%	2%– 4%	Below 2%
Property Tax Collection Rate	Above 94%	94%– 98%	Below> 98%

Source: U.S. EPA (1995).

Exhibit H-4: Assessment of Substantial Impacts Matrix

Secondary Score	Municipal Preliminary Screener		
	Less than 1.0%	Between 1.0% and 2.0%	Greater than 2.0%
Less than 1.5	?	X	X
Between 1.5 and 2.5	U	?	X
Greater than 2.5	U	U	?

X = impact is likely to be substantial
U = impact is not likely to be substantial
? = impact is unclear
Source: U.S. EPA (1995).

If substantial economic impacts are expected to be incurred, the applicant then must evaluate whether those impacts can be expected to be **widespread**. EPA (1995) guidance identifies three steps to determining whether impacts are expected to be widespread.

1. Define relevant geographic area.
2. Estimate socioeconomic changes due to pollution control costs (e.g., loss of employment, changes in property values, and higher taxes).
3. Consider multiplier effect.

Thus, the analysis is one of evaluating the change in the economic health of the community between precompliance and postcompliance. Of particular importance are changes in factors such as median household income, unemployment, and overall net debt as a percent of full market value of taxable property. The analysis should consider how increased public spending on pollution controls, as well as increased household spending on POTW user fees or taxes, will

affect the economy of the relevant geographic area. Increased spending on pollution controls is not "lost" from the economy, but rather represents a shift in expenditures. Thus, the widespread analysis must model the impact of pollution control expenses throughout the economy.

3.2 Screening Variables

As described above, the data to conduct the tests of substantial and widespread impact for affected POTWs in all of the 197 counties and independent cities in the watershed would be time consuming and costly to collect. Therefore, as a first step to assist States in narrowing down data collection efforts, the CBP constructed a screening variable to represent the MPS at the county level defined as:

> *Current residential sewer rate (household weighted average rate across POTWs in county incurring costs) plus estimated annual incremental control costs per household as a percent of county MHI.*

Data regarding the percentage of fee increases that residential customers will bear would be specific to each facility, and are generally not available. Therefore, a conservative assumption that households bear 100% of fee increases can be used (for screening purposes) to generate the highest possible (i.e., most conservative) MPS values. The actual portion of the rate increase borne by households can be investigated if analysis proceeds further for any particular community.

To estimate this variable, the CBP collected current sewer rate data from State, county, and municipal sources for 162 of the 305 POTWs identified as "significant" dischargers (i.e., that will require controls in Tiers 1-3). The CBP used a placeholder value of $200 for the 143 facilities for which no rate information could be located. MHI is from the 2000 Census of Population and Housing (U.S. Census Bureau, 2002), adjusted to 2001 dollars using the CPI (BLS, 2002).

To correspond with the estimated POTW costs, which reflect facility-estimated 2010 flows (including increases in 2010 capacity for some facilities that more than double current flows), per-household estimates of costs reflect estimated 2010 service populations. Households served in 2010 is derived by multiplying the number of households served in 2000 by the rate of population increase from 2000 to 2010, as projected by the Bay Program for the county containing the POTW. Data on population served in 2000 are from local and State sources, where available, or from the 1996 Clean Water Needs Survey (U.S. EPA, 1998) adjusted to 2000 using county-level population data from the U.S. Census. For the 45 facilities where no data are available, households served in 2000 is estimated based on the average flow (assuming100% residential flow), average indoor use of 64 gallons per person per day, persons per household in the County from the 2000 Census, and the CBP's 2010 county population projections.[1]

[1] For eight facilities, average 2000 flow is zero (indicating the facility was not operating by 2000 but would be operating by 2010). For these facilities, number of households served is based on average 2010 flow.

In counties that have multiple POTWs incurring costs under a tier scenario, the MPS screening variable is a service population weighted average of the individual POTW MPS values. This approach can obscure some high municipal MPS values among municipalities that have small population weights in the county totals. However, substantial impacts in these small municipalities are not likely to have widespread impacts if they are too small to have much influence on a county-level MPS. The Blue Plains WWTF in Washington, D.C. serves residents of more than one county. To calculate screening values for communities served by this facility, control costs are allocated to households in Montgomery and Prince George Counties, MD, Washington, DC, and to Fairfax County, VA, according to the methodology prepared by the Metropolitan Washington Council of Governments (MWCOG, 2002).

3.3 Screening Results

Exhibit H-5 provides a summary of the MPS screening values by tier scenario. For Tier 1, approximately 95% of the jurisdictions (counties and independent cities) have screening values in the range 0% to 1%; the remaining counties have values in the 1% to 2% range. In Tiers 2 and 3, the screening variable values are somewhat greater. Nevertheless, more than 80% of counties in Tier 2 and almost 80% in Tier 3 have screening values of less than 1%. Thus, the overall potential for substantial impact appears to be limited.

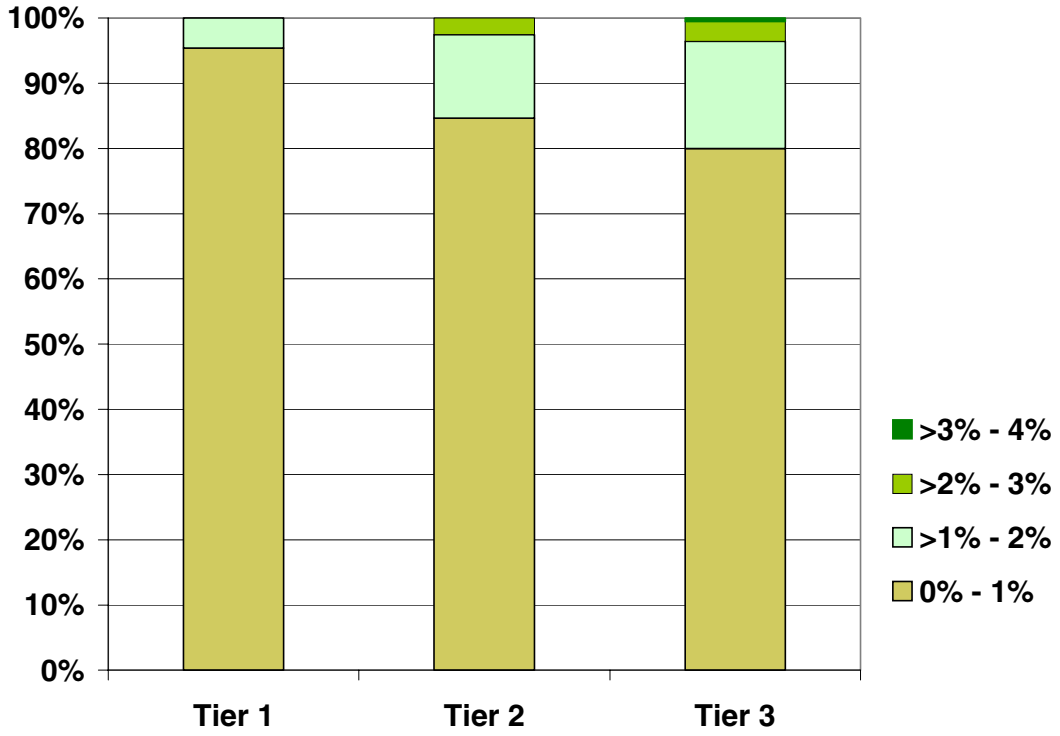

Exhibit H-5: Distribution of MPS Screening Values by Tier Scenario

There are four main sources of uncertainty regarding these screening results (**Exhibit H-6**). The assumption that households incur 100% of incremental control costs is likely to have the greatest impact and is discussed further below. The second source of uncertainty is the use of a

placeholder value of $200 for 143 POTWs for which current sewer rate data are not available. The direction and degree of bias caused by this assumption is unknown. Third, service population data are estimated for 45 facilities based on treated flows, which is consistent with the assumption that households incur 100% of costs, but may overstate the actual number households served. Finally, there are several facilities in the POTW cost database that are State and Federal facilities. Until these facilities are removed from the impact analysis, the MPS values for the counties that contain these facilities will be overstated.

Exhibit H-6: Sources of Uncertainty in the MPS Screening Variable

Assumption	Direction of Bias	Comments
Residential customers bear 100% of additional costs for most POTWs.	+	Actual MPS values will be lower after accounting for costs borne by industrial and commercial users.
No real income growth through 2010	+	Actual MPS values will be lower in areas for which real personal income is forecast to grow by 2010, and lower in areas where real income growth is forecast to decline by 2010.
Number of households served is calculated based on flow for 45 POTWs where other data are unavailable.	?	MPS screening values may or may not reflect actual MPS values.
Current annual residential sewer rate placeholder of $200 for 143 POTWs where other data are unavailable.	?	MPS screening values may or may not reflect actual MPS values.

+ = assumption results in overestimating screening variable value
? = impact of assumption on screening variables is unknown.

As an example of the impact of these uncertainties, the following comparison illustrates how the values might change when corrected for the proportion of costs that will be actually borne by households. **Exhibit H-7** provides data for the 34 POTWs with MPS screening values of 1.5% or more for Tier 3. The exhibit shows the number of households used to calculate the screening variable, and the number of households implied from POTW flow. If residences will most likely pay for 100% of incremental costs, then the two estimates should be similar; large differences may indicate that nonresidential customers (i.e., businesses and industries) account for a large proportion of flow and will likely incur a proportion of incremental costs.[2] Therefore, the MPS screening values for these facilities probably overstate the actual MPS. This appears to be the case for most of these facilities; the ratio of the MPS household estimate to the imputed household estimate is 50% or less for 23 of the 39 facilities. The last column of Exhibit H-7 shows what the MPS screening values would be if only a portion of incremental costs (equal to the ratio) accrue to residential customers. For example, if 54% of annual costs for the Bridgeville facility in Sussex, DE, accrue to households, then the tier MPS would be 1.5% rather than 2.0%.

[2] Inflow and infiltration may also be affecting flows.

Exhibit H-7: POTWs with Tier 3 MPS Screening Variable Values Above 1.5%

County	POTW Name	NPDES	MPS Screening Value	Number HH Served (MPS)	Number HH Served (Imputed)	Ratio of MPS HH to Imputed HH	Adjusted MPS Screening Value
Sussex, DE	Bridgeville	DE0020249	2.0%	760	1,406	54%	1.5%
Dorchester, MD	Hurlock	MD0022730	2.8%	501	6,928	7%	0.7%
Montgomery, MD	Seneca Creek	MD0021491	1.6%	2,053	41,088	5%	0.3%
Bedford, PA	Hyndman Borough	PA0020851	1.8%	462	513	90%	1.7%
Blair, PA	Logan Township-Greenwood Area	PA0032557	2.3%	462	2,375	19%	0.9%
Blair, PA	Martinsburg	PA0028347	1.8%	1,166	2,652	44%	1.4%
Juniata, PA	Twin Boroughs Sanitary Authority	PA0023264	1.7%	633	1,954	32%	1.0%
Mifflin, PA	Brown Township Municipal Authority	PA0028088	1.7%	699	2,158	32%	0.9%
Perry, PA	Marysville Municipal Authority	PA0021571	1.6%	2,902	7,017	41%	1.4%
Schuylkill, PA	Pine Grove Borough Authority	PA0020915	1.9%	1,002	2,684	37%	1.4%
Tioga, PA	Blossburg	PA0020036	1.6%	733	1,294	57%	1.2%
Tioga, PA	Elkland Municipal Authority	PA0113298	1.6%	785	2,702	29%	0.9%
Union, PA	Gregg Township	PA0114821	2.5%	181	3,104	6%	1.5%
York, PA	New Freedom WTP	PA0043257	1.7%	608	6,661	9%	0.5%
York, PA	Stewartstown Borough	PA0036269	1.6%	434	1,575	28%	0.7%
Accomack, VA	Tangier Island	VA0067423	2.4%	459	314	>100%	2.4%
Accomack, VA	Onancock	VA0021253	1.9%	652	1,591	41%	1.2%
Amherst, VA	Lynchburg	VA0024970	1.6%	15,537	72,028	22%	0.9%
Augusta, VA	Weyers Cave STP	VA0022349	4.3%	159	2,364	7%	0.8%
Hanover, VA	Doswell	VA0029521	1.5%	569	25,232	2%	0.6%
Lancaster, VA	Kilmarnock	VA0020788	2.5%	579	1,705	34%	1.7%
Mathews, VA	Mathews Courthouse	VA0028819	2.8%	186	307	60%	1.9%
Middlesex, VA	Urbanna	VA0026263	2.5%	325	382	85%	2.3%
Northampton, VA	Cape Charles	VA0021288	1.5%	791	1,021	77%	1.3%
Northumberland, VA	Reedville	VA0060712	2.3%	304	248	>100%	2.3%
Nottoway, VA	Crewe STP	VA0020303	1.6%	963	1,108	87%	1.5%
Rappahannock, VA	Remington Regional	VA0076805	1.6%	3,738	3,738	100%	1.6%
Richmond, VA	Warsaw	VA0026891	2.0%	946	946	100%	2.0%
Shenandoah, VA	Stony Creek STP	VA0028380	3.0%	278	1,685	17%	1.0%
Shenandoah, VA	New Market STP	VA0022853	2.1%	659	3,565	18%	1.3%
Westmoreland, VA	Colonial Beach	VA0026409	1.6%	1,803	5,357	34%	1.4%
Clifton Forge City, VA	Clifton Forge	VA0022772	3.4%	706	8,071	9%	1.2%
Staunton City, VA	Middle River	VA0064793	1.7%	1,028	23,262	4%	0.6%
Grant, WV	Petersburg	WV0021792	1.6%	960	4,014	24%	0.9%

Exhibit H-8 maps the MPS screening variable by county for Tiers 1. Values in the 1% to 2% range tend to occur in coastal counties in Virginia and Maryland. Rappahannock County, VA, has the highest Tier 1 MPS value (1.5%).

Results for Tiers 2 and 3 are very similar. The map in **Exhibit H-9** shows results for Tier 3; the map for Tier 2 is in Attachment 2 (see Exhibit H3-1). In Tier 3, several coastal counties and cities along the Rappahannock River and the Eastern Shore have the high screening values, although values are below 3%. Other areas with concentrations of MPS values above 1% include the Northwest Virginia-West Virginia region, Central Pennsylvania, and Northeastern Pennsylvania. Most of these locations (except the independent cities) have small service populations (e.g., fewer than 7,000 households each), which tends to increase the per-household cost compared to facilities that serve larger populations. Also many of them have median household incomes below $35,000.

As noted above, many of the counties with screening values greater than 1.5% may have actual MPS values that are lower (because households account for 50% or less of treated flow). Therefore, the MPS results can only indicate where substantial impacts are unlikely, and calculation of actual MPS values and secondary tests for substantial impact may produce different results.

3.4 Groundtruthing of Screening Results

To further investigate how well the MPS screening variable reflects the actual MPS value, this section provides more comprehensive analysis of the results for Allegany County, MD.

Exhibit H-10 provides a summary of the estimated costs and MPS screening variable across the modeling scenarios. There are three POTWs serving Allegany County. The MPS screening variable value is 0.8% under Tiers 1 and 2 and 0.9% under Tier 3, indicating substantial impacts are unlikely. A more detailed investigation of rates, flows, and the MPS for Tier 3 (**Exhibit H-11**) produces the same result (a MPS value of 0.7 %, also indicating substantial impacts are unlikely). Thus, under EPA guidance (1995), consideration of secondary tests for substantial impact is not necessary. Moreover, sensitivity analyses indicate that the ratio remains below 1% even if the analysis excludes anticipated grant funding equal to 50% of capital costs.

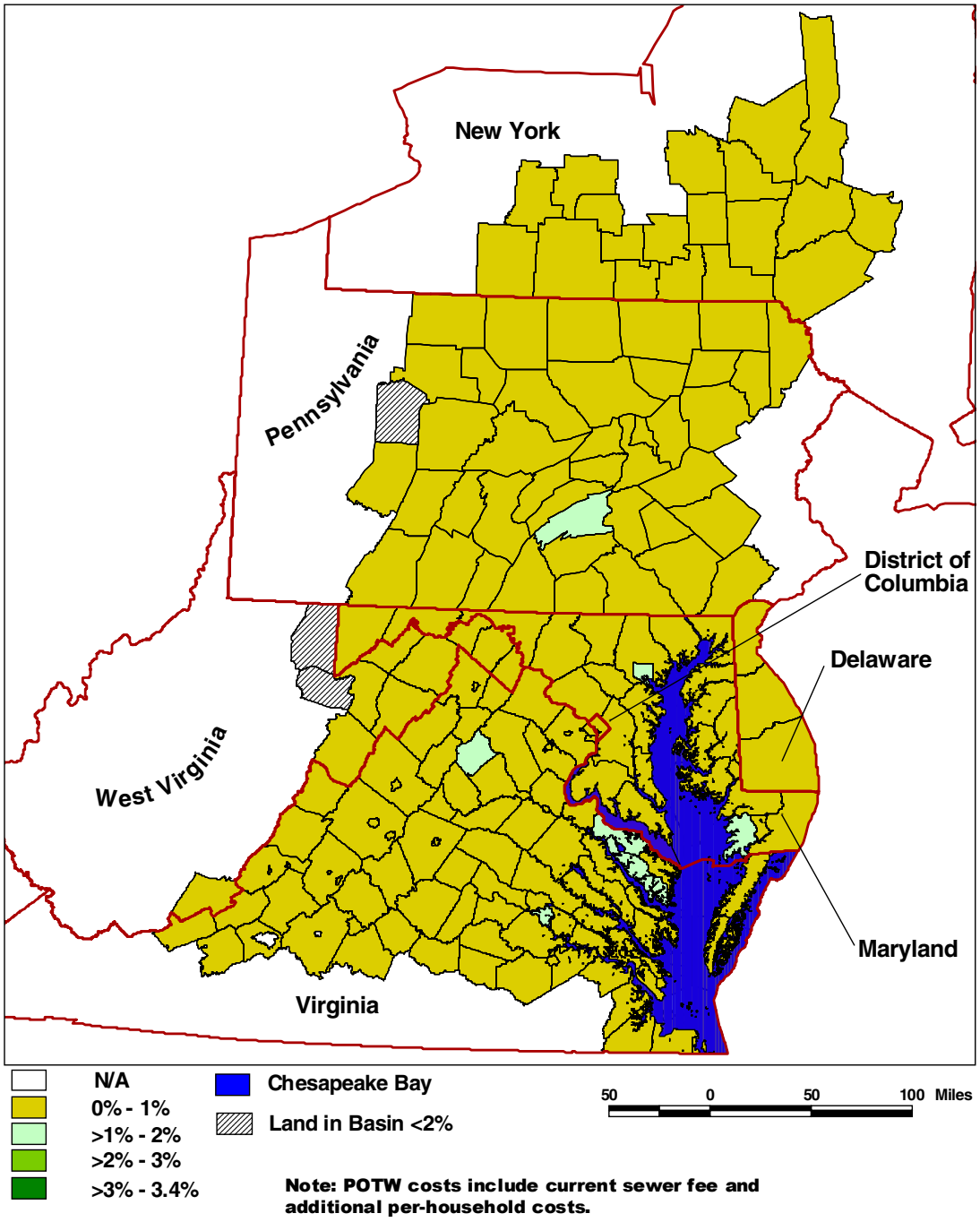

Exhibit H-8: Comparison of Total Household Sewer Costs to Median Household Income: Tier 1
(POTW Screening Variable Values)

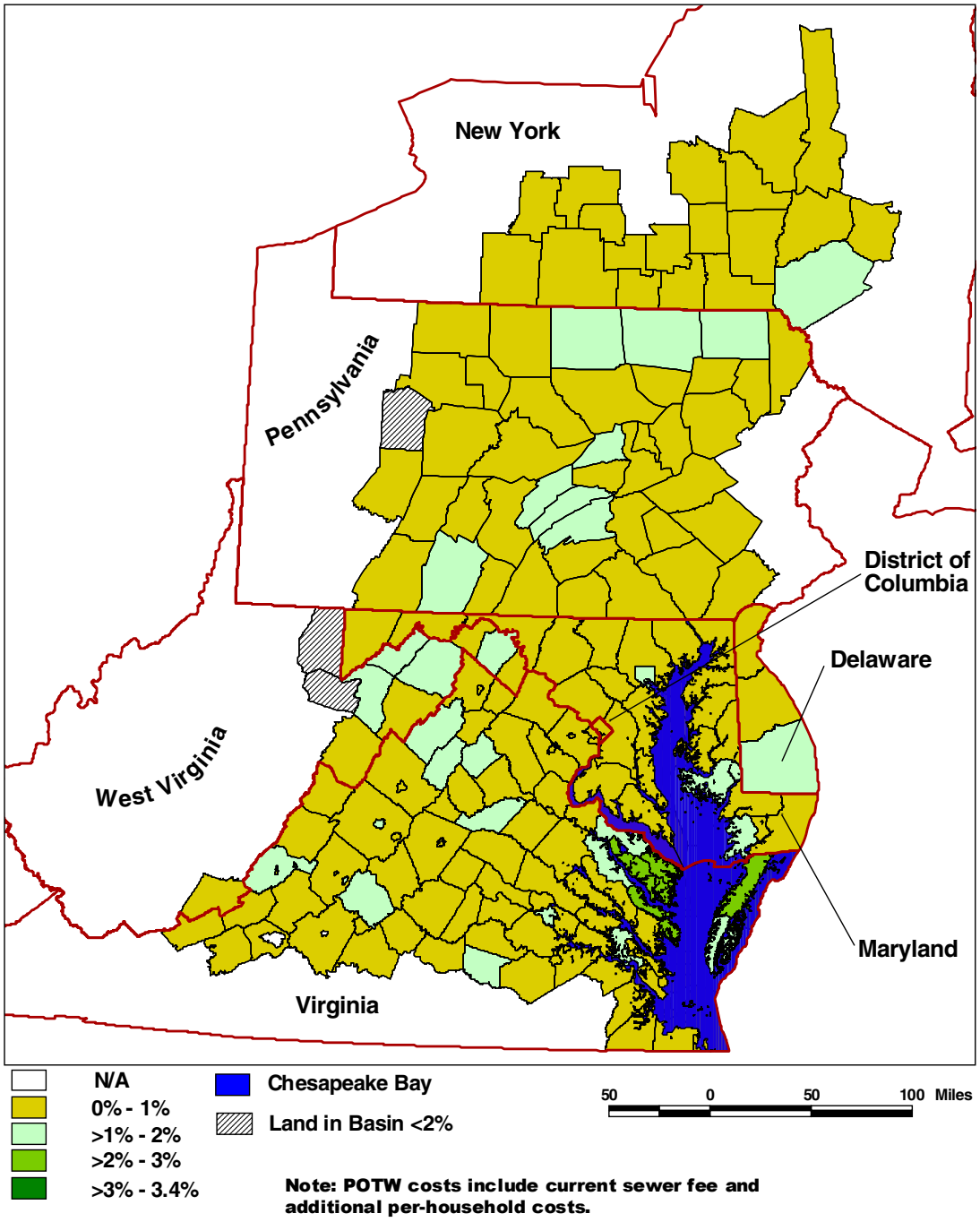

Exhibit H-9: Comparison of Total Household Sewer Costs to Median Household Income: Tier 3
(POTW Screening Variable Values)

Exhibit H-10: MPS Screening Data for Allegany County, MD (2001$)

Estimate	Tier 1	Tier 2	Tier 3
POTW Costs Borne by Households[1]	399,844	496,360	1,020,600
POTW Costs Borne by State[1]	242,874	251,790	523,825
MPS Screening Variable as percent of county MHI[2]	0.8%	0.8%	0.9%

1. Households pay for 50% of capital costs and 100% of annual O&M costs. The State grant pays for the remaining 50% of capital costs.
2. 2000 service population is estimated for 1 of the 3 significant POTWs serving Allegany County.

This detailed evaluation does not include review of the accuracy of the control costs and the technology selection (i.e., whether costs reflect the most cost-effective controls). Because the MPS value is below 1% for Tier 3, even if it were calculated without the 50% grant funding, potential estimation errors most likely do not affect this result. Current sewer rates account for the largest portion of the MPS value (the data in Exhibit H-11 result in a ratio of 0.63% before adding the cost of the tier controls), and provide the greatest source of error in the screening variable. Thus, basinwide, actual MPS values may differ substantially from the MPS screening variable values.

In addition, number of households served and the percent of costs that will be borne by households also influence the MPS screening variable value. For example, residential flow accounts for 50% to 74% of average daily flow for the Celanese facility and between 58% and 100% for Georges Creek. These discrepancies may be due to how inflow and infiltration is reported (however, correcting inflow and infiltration could influence the estimated treatment costs).

Although the MPS value for Allegany County indicates that there is no need to perform the secondary test, the CBP collected data for the secondary test to evaluate the feasibility of conducting the test. **Exhibit H-12** provides the data collected to calculate values for the six indicators used to construct the secondary test score. The indicator scores, shown in **Exhibit H-13**, result in a secondary test score 2. A secondary score of 2 combined with a MPS value of less than 1.0 implies that the impact is not likely to be substantial (see Exhibit H-4).

Exhibit H-11: Re-calculation of Municipal Preliminary Screener Value for Allegany County: Tier 3 (2001$)

Item	Georges Creek	Cumberland	Celanese
2010 Average Flow[1] (mgd)	0.67	9.60	1.02
Percent Residential Flow[2]	100%	94%	50%
2010 Households Served[3]	2,348	20,313	3,253
Tier 3 Total Capital Cost[1]	$2,846,898	$6,654,980	$7,302,636
Tier 3 O&M Cost[1]	$79,406	$250,534	$166,835
Expected Grant Funding	50%	50%	50%
Tier 3 Capital Cost Borne by Households[4]	$1,423,449	$3,127,841	$1,825,659
SRF Loan Rate	2.2%	2.2%	2.2%
Tier 3 Annualized[5] Capital Cost Borne by Households	$88,743	$195,000	$113,818
Tier 3 Annual Cost per Household[6]	$72	$21	$61
Current Yearly Sewer Rate[7,8,9]	$208	$208	$240
Estimated Annual Sewer Rate under Tier 3[10]	$280	$229	$301
Estimated 2001 MHI[11]	$32,764	$32,764	$32,764
Estimated MPS Value[12]	0.85%	0.70%	0.92%
Population-weighted Average MPS Value for County	0.74%		

1. Estimated by the Point Source Nutrient Reduction Task Force Workgroup.
2. Personal communication with R. Snyder and K. Hanft, Allegany Public Works, 2002.
3. 2000 population served escalated to 2010 levels using the Chesapeake Bay Program's projected growth rate for the county (1.04) and divided by 2.56 persons per household. 2000 populations based on personal communication with the Allegany County Utilities Division and the Cumberland facility.
4. Estimated by multiplying percent residential flow by total capital cost less grant funding.
5. Annualized at the State SRF rate (U.S. EPA, 2001) over 20 years.
6. Annualized cost borne by households plus the household share of annual O&M costs divided by estimated 2010 households served.
7. Source: Harford County Benchmarking Study, 2000.
8. Celanese serves Bowling Green, MD which has different sewer rates than the rest of the service population so a weighted average is used based on population.
9. Average household water usage assumed to be about 93,440 gallons per year based on 100 gpd/person (Viessman & Hammer, 1998) and 2.56 persons per household (2000 Census) to calculate Bowling Green rates.
10. Current sewer rate plus annual cost per household.
11. U.S. 2000 Decennial Census (2002) in 1999 dollars updated to 2001 dollars using the Consumer Price Index (i.e., assuming no real income growth from 1999 to 2001).
12. Estimated sewer rate under Tier 3 (in 2001 dollars) divided by estimated MHI (in 2001 dollars).

Exhibit H-12: 2001 Data Used in the Secondary Test: Allegany County, MD

Item	Source	Value
Bond Rating	Allegany County FY 2003 Budget, May 23, 2002	Standard and Poor's: A– Moody's: Baa1
Net Debt[1]	Allegany County Finance Office	$47,537,740
Market Value of Property	Allegany County (http://www.gov.allconet.org/finance/presentations.htm)	$2,027,094,175
Community Unemployment Rate	BLS, Local Area Unemployment Statistics, 2002	7.6%
National Unemployment Rate	BLS, Current Population Survey, 2002	4.8%
Community Median Household Income	U.S. 2000 Decennial Census, 2002	$32,764
State Median Household Income	U.S. 2000 Decennial Census, 2002	$56,200
Property Tax Revenues	Allegany County Tax Office and Allegany County Finance Office	$33,680,300
Property Tax Collection Rate	Allegany County Tax Office and Allegany County Finance Office	95%

1. Allegany County component unit debt only; does not include any other component units of the Allegany County reporting entity. Includes Nursing Home portion of 1978 and 1992 bond issues.

Exhibit H-13: Secondary Test Indicators for Allegany County, MD

Indicator	Secondary Indicator Ratings[1]			Score
	Weak	Mid-Range	Strong	
Bond Rating	Below BBB (S&P) Below Baa (Moody's)	BBB (S&P) Baa (Moody's)	Above BBB (S&P) or Baa (Moody's)	3
Overall Net Debt as Percent of Full Market Value of Taxable Property	Above 5%	2% – 5%	Below 2%	2
Unemployment	More than 1% above National Average	National Average	More than 1% below National Average	1
Median Household Income (MHI)	More than 10% below State Median	State Median	More than 10% above State Median	1
Property Tax Revenues as a Percent of Full Market Value of Taxable Property	Above 4%	2% – 4%	Below 2%	3
Property Tax Collection Rate	< 94%	94% – 98%	> 98%	2
Average Secondary Test Score				2

na = not applicable; S&P = Standard and Poor's Corporation; Moody's = Moody's Bond Record.
1. Weak is a score of 1 point, midrange is a score of 2 points, and strong is a score of 3 points.

4. INDUSTRIAL POINT SOURCES

Control costs for industrial point sources include annualized capital costs and annual O&M costs for NRT such as biological nitrogen removal (BNR). These costs will be borne by establishments designated as major industrial point dischargers by the Chesapeake Bay Program; the methodology for deriving costs is described in Appendix E.

EPA (1995) guidance describes tests (i.e., profit tests and assessment of liquidity, solvency, and leverage) for evaluating whether private sector entities may incur substantial financial impacts. However, since some of this data may not be readily available (e.g., for privately owned companies), it would be difficult to conduct these tests for all industrial dischargers in the basin. Instead, it may be more cost-effective to first identify areas in which substantial financial impacts also have the potential for widespread adverse impact on the surrounding area. The current economic condition of the affected community and the role of the affected entities is considered in such an evaluation (EPA, 1995). Similar to the POTW analysis, this evaluation is best performed with a regional model. However, there may be some readily available data related to potential for widespread impacts that could serve to focus subsequent analysis.

4.1 Tests of Substantial and Widespread Impact

The primary measure of impact for private sector entities is the estimated decline in the profit ratio [measured as pre-tax earnings (revenues minus costs) divided by revenues] expected as a result of the proposed pollution control expenditures. The profit ratios with and without pollution controls can be compared with industry-wide profit ratios to evaluate the relative strength of an entity, and how incremental pollution control costs might affect its financial strength. However, if a discharger is already in trouble (i.e., not profitable or profit far below industry norms), it may not claim that substantial impacts would incur due to compliance with water quality standards (U.S. EPA, 1995).

In addition to impacts on profits, three secondary measures are utilized to further define the financial impact of the pollution control project. The liquidity measure indicates how easily an entity can pay its short-term expenses, and is measured using the current ratio:

$$\text{Current Ratio} = \text{Current Assets}/\text{Current Liabilities}.$$

An entity is considered liquid if its current ratio is greater than 2. Ratio values less than 2 indicate potential liquidity problems. The ratio value, however, should be compared with industry averages as well as this rule-of-thumb value.

Solvency is a measure of how easily an entity can pay its fixed and long-term liabilities. Although there are various solvency ratios, the recommended one is the Beaver's Ratio (U.S. EPA, 1995), which is an indicator of bankruptcy:

$$\text{Beaver's Ratio} = \text{Cash Flow}/\text{Total Liabilities}.$$

An entity is considered solvent if its Beaver's Ratio is greater than 0.20. A ratio of less than 0.15 indicates insolvency and a high bankruptcy risk. A ratio between 0.15 and 0.20 is indeterminate, but indicates some bankruptcy risk.

A second solvency or leverage ratio, the debt-to-equity ratio, provides insight into how much debt is held relative to equity, whether additional debt can be obtained, and whether existing debt can be paid. The term leverage refers to the use of debt to leverage equity to acquire more assets and hopefully provide a bigger return on equity. One of the various forms of the debt-to-equity ratio is:

Debt-to-Equity Ratio = Long-term Liabilities/Owner's Equity.

The ratio value should be compared to similar businesses in the region or industry averages to determine whether the entity's degree of leverage is typical or whether it is highly leveraged, which indicates an increased risk of business failure as well as a higher difficulty in borrowing to finance incremental control costs.

If these financial tests indicate that the proposed pollution controls would have adverse financial impacts on the business entity, then the costs meet the substantial impact test. The next step is to determine whether the impacts are also widespread.

The analysis of widespread impacts proceeds similar to that for public sector entities. In both cases, the entity must first identify the relevant geographical area. For private sector entities, this is typically the area in which most of the affected workers live and where dependent businesses are located. The second step for analyzing widespread impacts due to private sector entities is to estimate the socioeconomic changes that would result from reducing business operations (e.g., changes in employment and property taxes). Finally, the analysis should consider multiplier effects. As discussed above, this type of analysis is best accomplished through regional economic modeling.

4.2 Screening Variables

Although these tests of substantial and widespread impact are not readily constructed for all the significant industrial point sources in the basin, a screening variable can be constructed to narrow down areas that are unlikely to experience such impacts. One choice for such a variable is the earnings in the county that are generated by the discharger. However, this data is not available from any national database because of nondisclosure requirements. What is available is the earnings derived from the industrial category that the discharger is classified in, although this will include earnings from businesses that are not affected by the tier scenarios. Therefore, the screening variable can only show where widespread impacts are unlikely because the sector that contains an affected business accounts for a small share of local earnings.

The earnings data for this variable are from the Bureau of Economic Analysis Regional Economic Information System (BEA REIS), and reflect data for 1999 at the two-digit SIC level for the following industries, which contain the industrial dischargers with nutrient controls:

- Agricultural services, forestry, and fishing, including aquaculture (SIC 07-09)
- Food and kindred products and tobacco (SIC 20-21)
- Pulp and paper (SIC 26)
- Chemicals and allied products (SIC 28)
- Transportation and public utilities (SIC 40-49)
- Other manufacturing (SIC 20-39, except as assigned elsewhere).

As an example, the three significant dischargers in Chesterfield County, VA are classified in food and kindred products and tobacco, pulp and paper, and chemicals and allied products. Thus, the screening variable for this county is the percentage of earnings derived from these three sectors.

4.3 Screening Results

Exhibit H-14 provides a summary of the industrial point source screening values. Because the value of the screening variable does not depend on the tier scenario, the results are identical for all three tiers. Approximately 91% of the 184 counties where relevant subsector earnings are known have screening values in the range from 0% to 1%; an additional 3% have screening values between 1% and 5%. Only 6% of counties have affected sectors that account for 5% or more of earnings, and the affected dischargers account for even smaller shares of local earnings. The instances of relatively high indicator values are rarely in counties that have dischargers in multiple potentially affected sectors, although where this does happen, the variable reflects the combined earnings of those sectors. These results do not reflect the 10 counties with missing BEA earnings data for at least one sector containing an affected discharger.

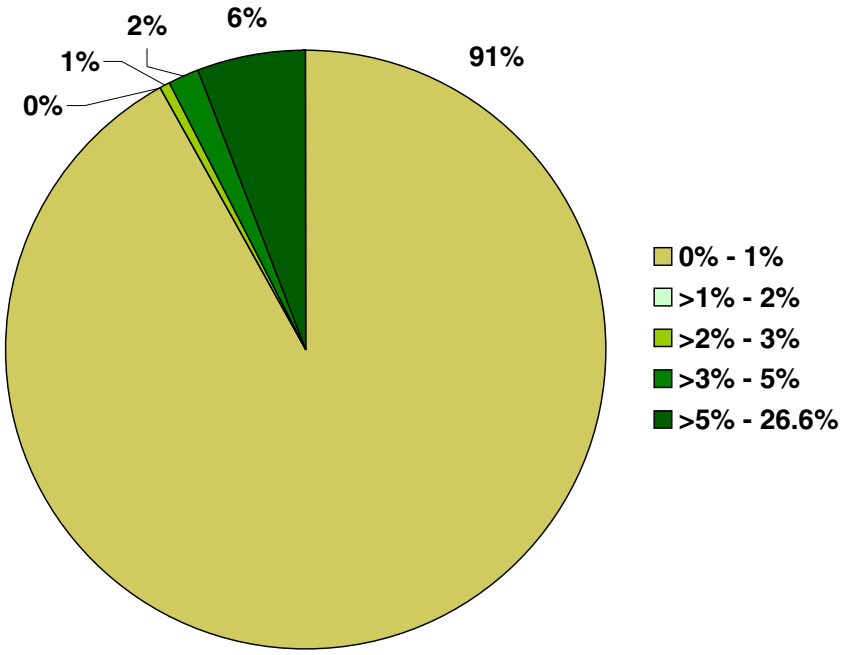

Exhibit H-14: Distribution of Industrial Point Source Screening Values

This screening analysis does not mean that the counties with higher variable values will experience widespread impacts. It also does not indicate whether any dischargers would even incur substantial impacts. It only indicates where the broad, multi-firm industries that contain a discharger are too small to contain single firm capable of having widespread impacts on economic conditions such as total employment, output, or tax revenues. Therefore, it is possible that the counties with high values will not experience substantial and widespread impacts. For example, the county with the highest screening value is Bradford, PA (26.6%). The annual Tier 3 control cost for the industrial discharger in that county is less than $6,000. If the discharger is large enough to have a widespread effect on the local economy, this annual cost would not have a substantial impact on its financial status. If, however, the company is small enough that a $6,000 annual cost increase would have a substantial financial impact, then it probably accounts for only a very small share of the 26.6% of earnings in the industrial category it falls under. Thus, it is not likely to have a widespread impact.

To determine the impacts of nutrient control costs, an analysis of substantial and widespread impacts would be needed for the counties with higher screening variable values as well as those with missing values. Such an analysis would consist of evaluating the financial impacts on the discharger and, if determined to be substantial, whether there would also be widespread adverse impacts to the community (U.S. EPA, 1995).

The map in **Exhibit H-15** shows the values of the screening variable for widespread industrial sector impacts. The highest values occur in scattered locations throughout the watershed, although several adjacent counties in east-central Pennsylvania and northern Maryland have indicator values in the higher portion of the observed range. The screening variable value is missing for the counties that have incomplete BEA data. Therefore, they appear as white (N/A) on the map.

4.4 Groundtruthing of Screening Results

To further investigate how well the industrial discharger screening variable reflects the likelihood of widespread impacts, this section provides more comprehensive analysis of the results for Allegany County, MD.

There is only one industrial discharger in Allegany County that would incur compliance costs under Tier 3. The affected discharger is the Upper Potomac River Commission (UPRC, or the Commission), which is in SIC 2621 (pulp and paper). Thus, the screening variable would consist of the percentage of earnings derived from the pulp and paper sector by place of work in 1999. However, the BEA did not disclose data for earnings from pulp and paper in Allegany County in 1999 (or for any year between 1996 and 2000) and, therefore, the screening variable for widespread impact potential is not defined. This indicates that either there were fewer than three firms in the pulp and paper sector, or that one firm accounted for over 80% of earnings. Based on the results of the screening variable, the potential for widespread impacts in Allegany County is unknown (i.e., there could be one large facility that contributes substantially to earnings, but there could also be just one or two small firms). Therefore, the possibility of widespread impacts cannot be ruled out; a more comprehensive analysis is needed to determine whether impacts would indeed be substantial and widespread.

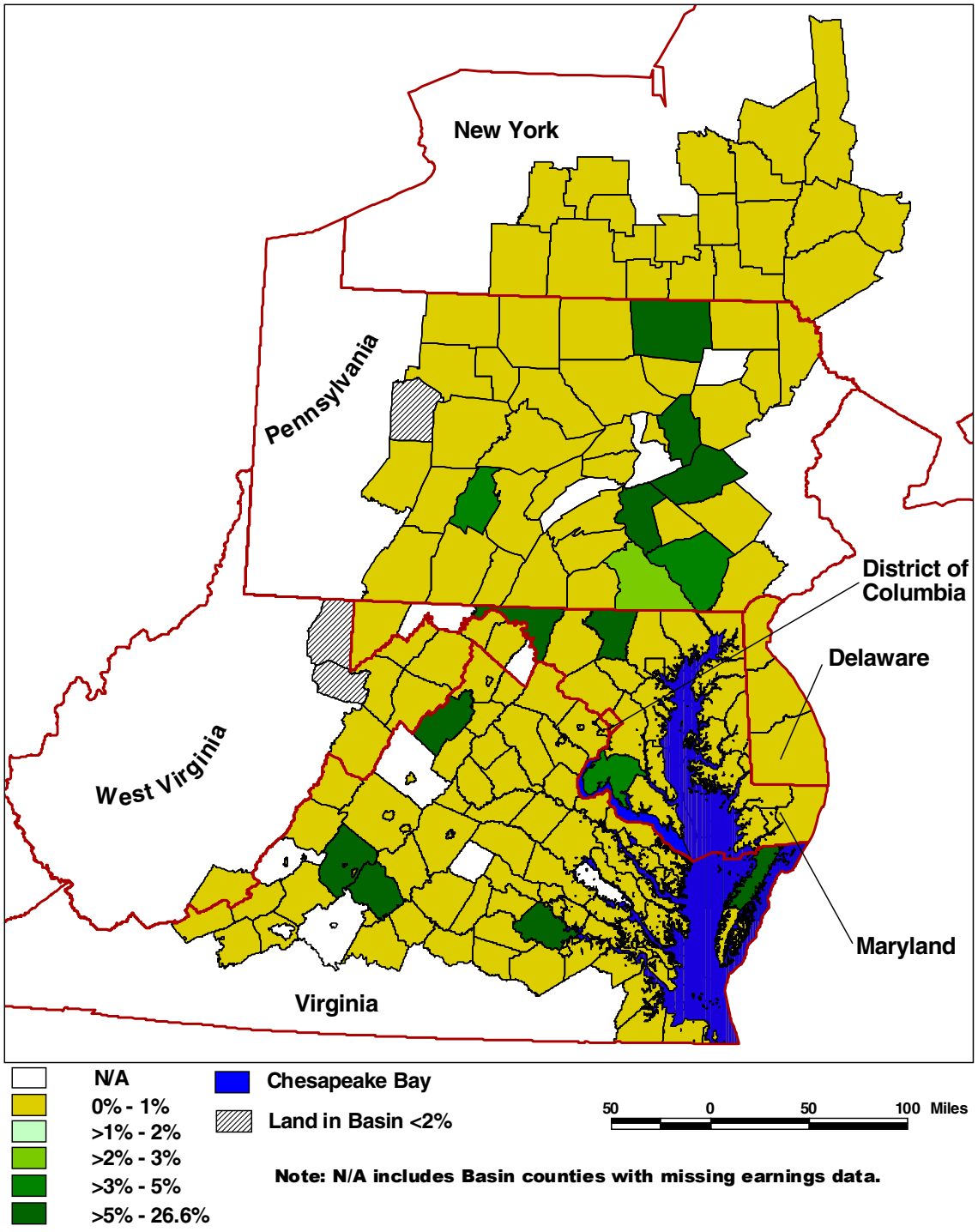

Exhibit H-15: Comparison of Earnings from Industrial Discharger Category to Total Earnings (Industrial Sector Screening Variable Values)

The UPRC operates the Westernport wastewater treatment facility, which treats primarily industrial waste from the Mead-Westvaco Corporation's Luke Mill (approximately 98% of flow) and municipal sewage from the towns of Westernport and Luke, Maryland, and Piedmont, West Virginia. Estimated costs for this facility are shown in **Exhibit H-16**. These costs would most likely be passed on to the mill.

Exhibit H-16: Estimated Costs for the Upper Potomac River Commission (2001$)

Scenario	Capital	O&M	Total Annualized
Tier 1	$0	$0	$0
Tier 2	$0	$0	$0
Tier 3	$0	$109,197	$109,197

Thus, the first step in the comprehensive analysis is to test the screening analysis results by assessing the importance of the pulp and paper industry in Allegany County. According to the 1997 Economic Census, there is only one establishment involved in paper manufacturing in Allegany County. This establishment employs between 1,000 and 2,499 full-time and part-time workers, but the Economic Census does not disclose data on payroll or sales and shipments. The Allegany County Department of Economic Development (2002), however, reports that the paper company Westvaco employs 1,500 people in the county, or about 5% of the total number of workers employed. Westvaco company documents indicate that the company operates eight paper mills in the United States, including one in the town of Luke in Allegany County.

Plant-specific data on sales and profits for the Luke paper mill are unavailable from the company's published financial report. However, the paper segment of Mead-Westvaco generated $1.1 billion in sales and $50.8 million in operating profits in 2001; $1.2 billion in sales and $140.6 million in operating profits in 2000; and $1.1 billion in sales and $62.0 million in operating profits in 1999. The nutrient control costs shown in Exhibit H-16 for the facility operated by the UPRC are very small compared to these profits. Thus, it is unlikely that these costs would have a substantial financial impact on the facility.

Given that substantial impacts are unlikely for this facility, the evaluation of widespread impacts is not necessary. However, had the earnings data been available to calculate the widespread indicator, it could have misleadingly shown potential for impact (because a large share of earnings in the county may be attributable to this sector). This implies that the widespread indicator alone (or the inability to calculate an indicator value in some cases) is not sufficient as indication of the potential for both substantial and widespread impacts.

5. FORESTRY

Controls for nutrient pollution from forest harvest sites consist of BMPs to reduce erosion and sediment runoff on harvest sites. The costs of implementing BMPs will be borne by logging operations and other private sector entities involved in timber extraction.

EPA (1995) guidance describes tests (i.e., profit tests and assessment of liquidity, solvency, and leverage) for evaluating whether private sector entities may incur substantial financial impacts. However, these tests require data that are not readily available for all the forestry operations in the basin. Thus, it would not be a worthwhile analysis to screen for potential substantial impacts. Additional analysis must be performed to demonstrate that any substantial impacts would also result in widespread adverse impacts on the community (EPA, 1995). Similar to POTWs (see Section 1.2), this evaluation may be best performed with a regional model. However, there may be some readily available data related to potential for widespread impacts that could serve to focus subsequent analysis.

5.1 Tests of Substantial and Widespread Impact

EPA (1995) guidance for analyzing impacts on private sector entities is summarized in Section 4.2. Analysis of substantial impacts relies on comparing the profit rate with and without the costs of pollution controls, as well as evaluating financial ratios measuring liquidity, solvency, and leverage. To analyze widespread impacts requires identifying the relevant geographic area, estimating the socioeconomic impacts that would result from reducing business operations, and considering multiplier effects.

5.2 Screening Variables

Although the tests of substantial and widespread impact listed in EPA (1995) guidance are not readily constructed for entities involved in timber harvesting in the Bay watershed, a screening variable can be constructed to narrow down areas that are unlikely to experience such impacts. For example, small shares of earnings from forestry and related sectors may indicate that any impacts would not result in widespread adverse impacts on a community (because it does not rely on those sectors for earnings). The screening variable is defined as earnings from forestry plus estimated earnings from the logging sector as a percent of all earnings in the county.

The earnings data for this variable are from the BEA REIS, and reflect 1999 earnings by place of work. REIS provides data on earnings from forestry and from lumber and wood products except furniture, which includes logging as well as sawmills, manufacturers of lumber, prefabricated wood buildings, wood containers, and other wood products. If the screening variable included earnings from the entire lumber and wood products sector, it would tend to overstate the importance of forestry and logging. Thus, the screening variable includes earnings from forestry plus a portion of the earnings from lumber and wood products. The proportion is from the 1997 Economic Census, which indicated that nationally, logging subsector payroll equals 10.8% of the total payroll from lumber and wood products (U.S. Census Bureau, 2000).

5.3 Screening Results

Exhibit H-17 provides a summary of forestry screening values. Because the value of the screening variable does not depend on the tier scenario, the results are identical for all three tiers. Estimated earnings from forestry and logging account for less than 1% of total earnings in 95% of jurisdictions. In only 1% of jurisdictions does the indicator value exceed 2%. The maximum value of 2.59% occurs in Buckingham County, VA. This result suggests that widespread impacts due to forestry BMPs are unlikely in most areas, regardless of whether costs impose substantial impacts on businesses. Thus, a finding of substantial and widespread impact based on the forestry BMPs is unlikely to occur.

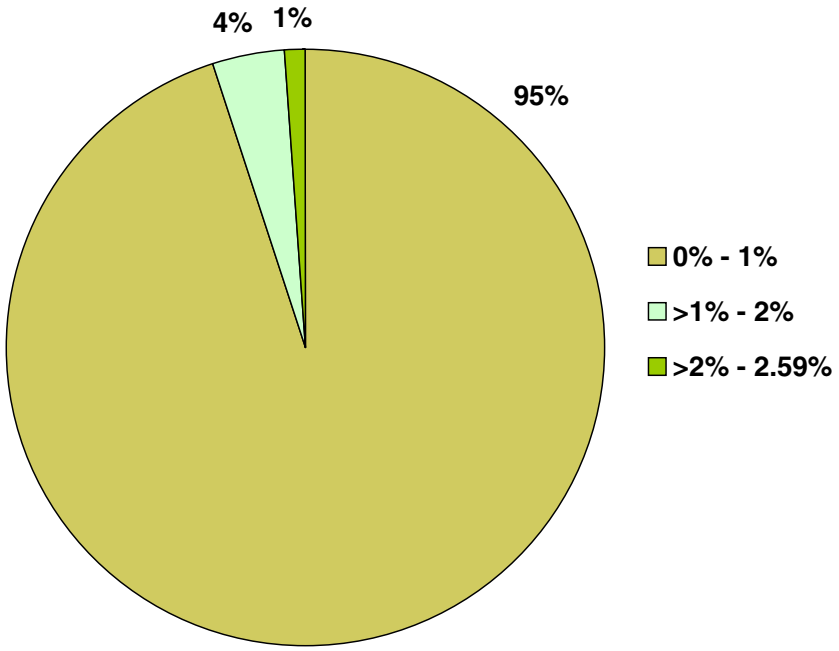

Exhibit H-17: Distribution of Forestry Widespread Indicator Values

The map in **Exhibit H-18** shows that the counties with the highest indicator values are scattered in central Pennsylvania, central and coastal Virginia, and most of the West Virginia counties in the watershed. The two counties with indicator values in excess of 2% are Buckingham, VA (2.6%) and Snyder, PA (2.2%).

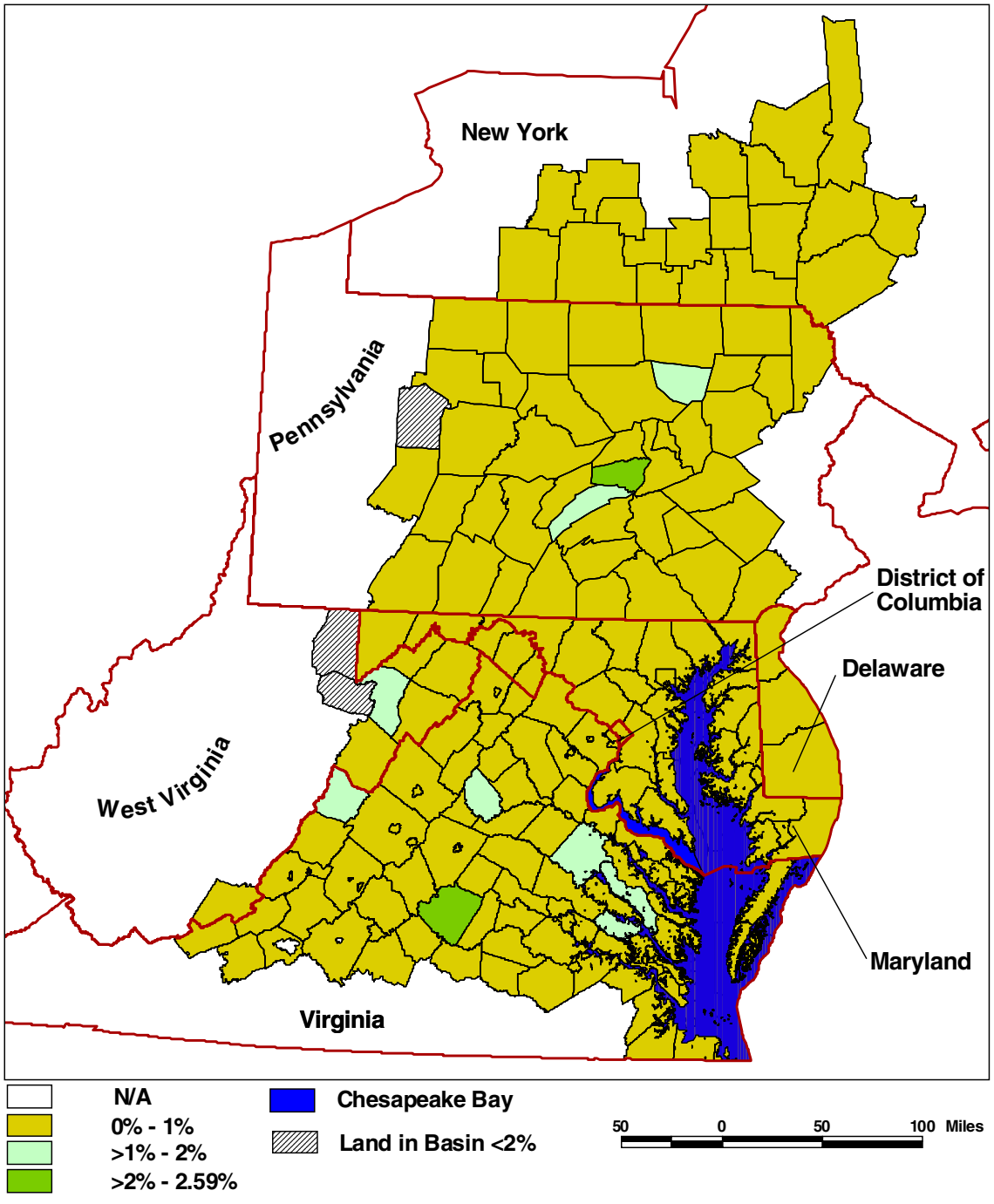

Exhibit H-18: Comparison of Forestry and Logging Earnings to Total Earnings (Forestry Sector Screening Variable Values)

The BEA's nondisclosure policies result in some uncertainty regarding these screening results. As reported in Section 2.4, the BEA does not disclose earnings data when there are just one or two firms in a sector, or when one firm contributed more than 80% of the earnings in a sector. The BEA did not disclose forestry earnings data for 95 of the 197 Basin counties in 1999. State-level percentages, which are disclosed for all States except Delaware and West Virginia, range from 0.05% to 0.2%, indicating that the degree of bias resulting from undisclosed data is likely to be small. Earnings data from slightly larger sector breakouts support this notion. For instance, earnings from forestry, fishing, and the BEA "other" category (U.S. citizens employed by international organizations and foreign embassies), or FFO, are disclosed for 16 of the 95 counties where disaggregated forestry earnings data are not available; earnings from this larger sector range from 0.01% to 2.0%, with an average of 0.03%. Earnings from an even larger sector, agricultural services combined with forestry, fishing and other (ASFFO), are disclosed for an additional 42 counties, and range from 0.1% to 2.8% with an average of 0.5%. State-level data from Maryland, the District of Columbia, Pennsylvania, New York, and Virginia indicate that forestry accounts for at most 70% of the combined earnings of FFO and at most 3% of the combined earnings of ASFFO (State-level data on forestry earnings in Delaware and West Virginia are not disclosed and thus these ratios cannot be calculated for those States). Thus, the bias introduced by the nondisclosure of forestry earnings data is likely to be small.

5.4 Groundtruthing of Screening Results

To further investigate how well the forestry sector screening variable reflects the likelihood of widespread impacts, this section provides more comprehensive analysis of the results for Allegany County, MD.

The screening variable value for Allegany County rounds to zero, indicating that substantial and widespread impacts due to forest harvest BMPs would be extremely unlikely. Forestry and estimated logging accounted for 0.01% of all county earnings in 2000, demonstrating that impacts on this sector are not likely to change the economic variables that are indicative of widespread impacts.

6. AGRICULTURE

Controlling nutrient pollution from agricultural operations requires BMPs including forest buffers, grass buffers, wetland restoration, retirement of highly erodible land, tree planting, soil conservation and water quality plans, cover crops, streambank protection, nutrient management plans, grazing land protection, animal waste management systems, yield reserve (i.e., enhanced nutrient management planning), carbon sequestration, export of excess nutrients, and conservation tillage. The costs of the BMPs will be paid by farming operations involved in crop and livestock production, and by State and Federal governments through agricultural BMP cost-sharing and grant programs.

6.1 Tests of Substantial and Widespread Impact

EPA (1995) guidance for evaluating substantial impacts on private entities is described in Section 4.1. However, this guidance may not be applicable to farms for two reasons. First, many are small family farms that may not be operated solely for business purposes. The U.S. Department of Agriculture classifies small family farms (less than $250,000 in sales) based on the operators' expectations from farming, stage in the life cycle, and dependence on agriculture: (1) limited resource, (2) retirement, (3) residential/lifestyle, (4) farming occupation/lower sales, and (5) farming occupation/higher sales farms (USDA, 2000b). USDA data indicate that a majority of farms are small operations that derive household income primarily from off-farm sources (USDA, 2000b). This raises the issue of whether a household or a business screening indicator is more appropriate for analysis of impacts.

In addition, the agricultural industry as a whole is highly subsidized, which means that EPA guidance for evaluating private sector business impacts may be less appropriate than for other privately owned sources in the basin. Many agricultural producers do not meet the profitability requirement in EPA guidance (private sector entities must be profitable before implementing pollution controls for substantial impacts to result from such costs). Data from the BEA REIS indicate that, on average, farming in most watershed counties is not profitable, with average realized net income for the five years between 1996 and 2000 below zero for about half of the counties partially or wholly in the watershed. However, data are not available at the individual farm level to exclude unprofitable entities from a private sector analysis.

As described in Sections 3.2 and 3.2, the analysis of widespread impacts involves three steps: identify the relevant geographical scope; estimate the socioeconomic changes that would result from any substantial financial business impacts; and consider multiplier effects in the wider economy.

6.2 Screening Variables

Although data required for the analysis of substantial and widespread impacts on agricultural operations are not readily available, screening variables can be constructed to narrow down areas

that are unlikely to experience such impacts. For businesses where all profits are not converted to owner salaries (e.g., corporate farms), the impact on profits can be tested:

- BMP costs as a percent of net cash return (NCR) from agricultural sales plus government payments ("NCR screening variable").

However, data are not readily available to construct this ratio for the individual farms for which such a business indicator would be appropriate. County level data including the NCR may not provide an accurate indication of the potential for impacts. Nationally, 80% of farms are small family farms that have very low average net income (less than $5,000) from the farm operation (USDA, 2000b). Many of the these farms lose money on farming, but farm households have higher incomes and greater wealth than the average U.S. household (USDA, 2002). Data on sales and corporate ownership reveal that most farms in the Bay watershed are small, unincorporated farms. For example, the USDA National Commission on Small Farms defines small farms as those grossing less than $250,000 annually in agricultural sales (USDA, 2000b), and small farms account for more than 85% of farms in 150 out of the 169 counties with farms that are partially or wholly in the watershed (28 counties, primarily the independent cities of Virginia, have no farms). Similarly, unincorporated farms account for more than 90% of the farms in 148 of the 169 counties with farms.

The NCR screening variable reflects EPA (1995) guidance for evaluating impacts on private entities by calculating control costs as a percentage of pre-tax profits. EPA (1995) indicates that profits should be measured as business income minus expenses, including depreciation and changes in net inventories (i.e., the value of a net inventory increase should be added to profit or the value of a net inventory decrease should be subtracted). A proxy for profit at the county level is net cash return from agricultural sales (NCR) plus government payments, from the 1997 Census of Agriculture (USDA, 2000a). NCR is the market value of agricultural products sold minus cash operating expenditures.[3] Because these expenditures can include the farm owner's own income, low profits may understate the amount of income the farmer actually receives from the business.

EPA (1995) recommends that profit tests on private entities be based on three consecutive years of profit data because of potential variability in profits from year to year. However, Census of Agriculture data are only available every five years (e.g., 1987, 1992, 1997). In addition, annual data on realized net income from the BEA REIS cannot be used to impute net cash return for years other than 1997 because the two data series reflect different definitions and data sources. However, REIS data do indicate that realized net income in 1997 was lower than average for most counties in the watershed between 1996 and 2000. If the same trend holds true for NCR, then the screening variable based on 1997 NCR will tend to overstate the potential for impacts.

[3] For this indicator, NCR and government payments are prorated for the proportion of agricultural land in the county that lies in the Bay watershed (see Attachment 1 for details). The implicit assumption in this adjustment is that net farm income is distributed evenly over the agricultural land in a county.

As a measure of profit, NCR is incomplete because it does not account for depreciation, inventory changes, or government payments [other than receipts from placing commodities in the Commodity Credit Corporation (CCC) loan program]. To compensate for the lack of government payments, non-CCC government payments are added. However, the Census of Agriculture does not release data on depreciation or inventory changes.[4]

Two additional variables can help to characterize BMP costs relative to sales in farm subsectors. As with the other screening variables, these variables only show areas where costs are not likely to meet the criteria for having substantial and widespread impacts:

- Crop BMP costs (including a portion of hay crop BMP costs) as a percent of crop and hay sales

- Livestock BMP costs (plus a portion of hay crop BMP costs) as a percent of livestock and livestock products sales.

Data for crop and livestock-related sales are the "market value of agricultural products sold" from the 1997 Census of Agriculture (USDA, 2000a), inflated to 2001 dollars using USDA price indices (USDA, 2001).[5] Hay BMP costs will accrue to both the crop sector (where hay is grown for sale) and the livestock sector (where hay is grown for onsite use). Therefore, these costs are distributed between the crop and livestock sectors according to the percentage of sales derived from each sector within the county. All hay sales, however, are included in the crop sales variable because hay grown by livestock operations is more likely to be used on the farm for feed and bedding rather than sold in the market.

Comparison of BMP costs to household income may also provide some indication of where substantial impacts are unlikely:

- Mean per-farm BMP costs as a percent of estimated MHI ("MHI screening variable").

Mean per-farm costs are total county-level BMP costs divided by the 2010 projection of the number of farms within the watershed portion of the county. County MHI is from the 2000 Decennial Census (U.S. Census Bureau, 2002), adjusted to 2001 dollars using the Consumer Price Index (BLS, 2002). For individual counties, farm MHI may be larger or smaller than county MHI; however, nationwide, MHI for farm households is larger than MHI for all households (USDA, 2002).

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[4] The Conservation Reserve Program and Wetlands Reserve Program funding is not included in the adjusted NCR estimate to avoid double-counting these payments, first as income and again as BMP cost offsets.

[5] The county-level data are prorated to reflect the portion of agricultural land in the county within the watershed, as in the NCR indicator; however, agricultural sales may or may not be distributed evenly over the agricultural land within a county.

Note that the household cost variable is not based on EPA guidance—EPA (1995) provides profitability tests for businesses. Consequently, there is no benchmark for determining what percentage of total household income the business-related expenses could equal before imposing substantial impacts; benchmarks for MPS screener values do not apply to business-related expenses. Thus, this variable can only identify when BMP costs are small relative to household income.

The four screening variables described above may help to narrow down areas where substantial impacts are unlikely. To help identify where substantial impacts would not also be widespread, the relative importance of the agricultural sector the local economy can be calculated:

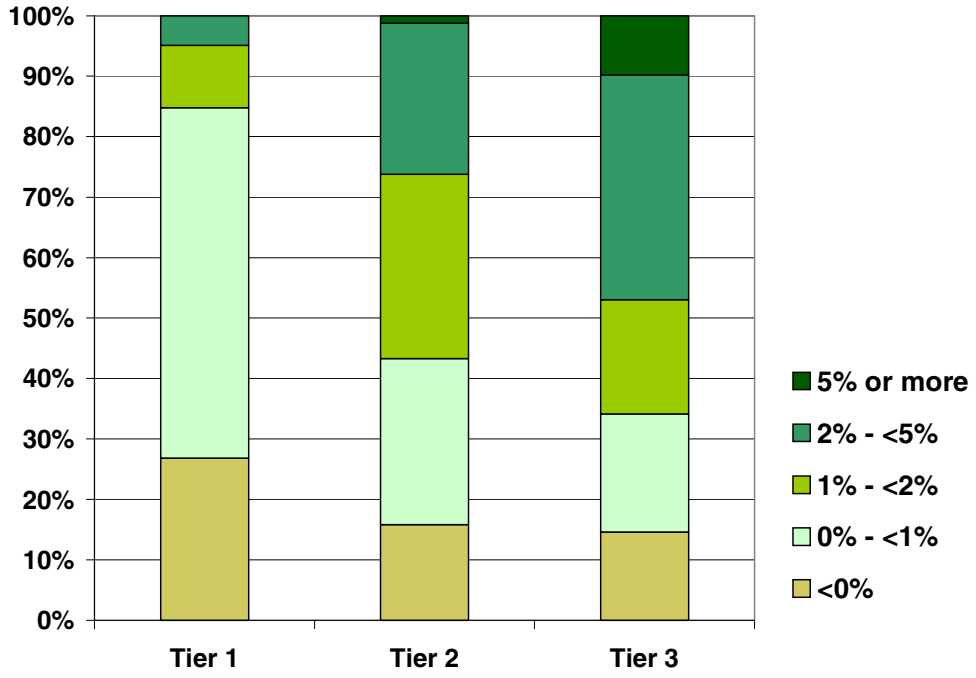
- Earnings from agriculture and related sectors in the county as a percent of all earnings in the county.

For this variable, the earnings data are from the BEA REIS (BEA, 2001) and reflect 1999 earnings by place of work (i.e., they are based on earnings made by people who work within a county rather than by people who live within a county). The ratio includes earnings from sectors upstream (agricultural services) and downstream manufacturing (food and kindred products, tobacco) to account for potential impacts on sectors that depend on farming. However, the inclusion of these additional sectors potentially makes this screening variable more ambiguous. Upstream sectors may see a rise in business activity due to implementation of BMPs; the effects on downstream sectors are also difficult to determine because many food processing businesses may receive inputs from outside the watershed or also benefit from improving Bay water quality (i.e., seafood producers in coastal counties). Therefore, results for this screening variable are also shown without earnings for the related sectors to test the sensitivity of including those sectors.

6.3 Screening Results

This section contains results for the crop sales, livestock sales, and MHI screening variables. Results for the NCR screening variable are not discussed (values are reported in Attachment 2) because NCR is a poor measure of farm profitability and the presence of subsidies distorts financial conditions such that a standard analysis of private business impacts is infeasible. Furthermore, most of the operations in the watershed are not strictly business operations; they are small, unincorporated “family farm” operations where off-farm income often subsidizes farm operations. Therefore, at the county level, this variable does not provide much information

Exhibit H-19 shows the distribution of values for the crop sales screening variable by tier scenario. Under Tier 1, 85% of counties have values below 1%, which means county-wide BMP costs equal less than 1% of annual crop and hay sales. More than 25% of counties have values below zero, which indicates net cost savings or net revenue from cost-share programs. In Tier 2, approximately 74% of counties have screening variable values below 2% and costs remain less than 1% of sales for more than 40% of counties. In Tier 3, variable values remain below 2% for about half of the counties.



Negative values indicate a cost savings compared to the 2000 Progress scenario.

Exhibit H-19: Distribution of Crop Screening Values by Tier Scenario

Maps in **Exhibits H-20** (Tier 1) and **H-21** (Tier 3) illustrate the shift in screening variable values across the tier scenarios; the map for Tier 2 is in Attachment 3. In Tier 1, the highest values occur in or near West Virginia. In contrast, net cost savings accrue to much of central Virginia and coastal Maryland, primarily because of Federal and State incentive payments for implementation of certain BMPs (in addition to maintenance payments and installation grants) in those States. Some net cost savings persist in Tier 3, particularly in Maryland, again due to incentive payments. Two counties, Cameron County in Pennsylvania and York County in Virginia, appear white because the Census of Agriculture does not report crop sales for those counties.

The screening variable values based on livestock sales (**Exhibit H-22**) tend to be higher than the variable values based on crop sales across all tier scenarios. Approximately 71% of counties have values below 1% in Tier 1, and a few counties have values in the 2% to 5% range or higher. In Tier 2, almost 50% of counties have variable values less than 1%; in Tier 3 this share falls to 30%. There are higher proportions of counties with the higher values compared to the crop sector results.

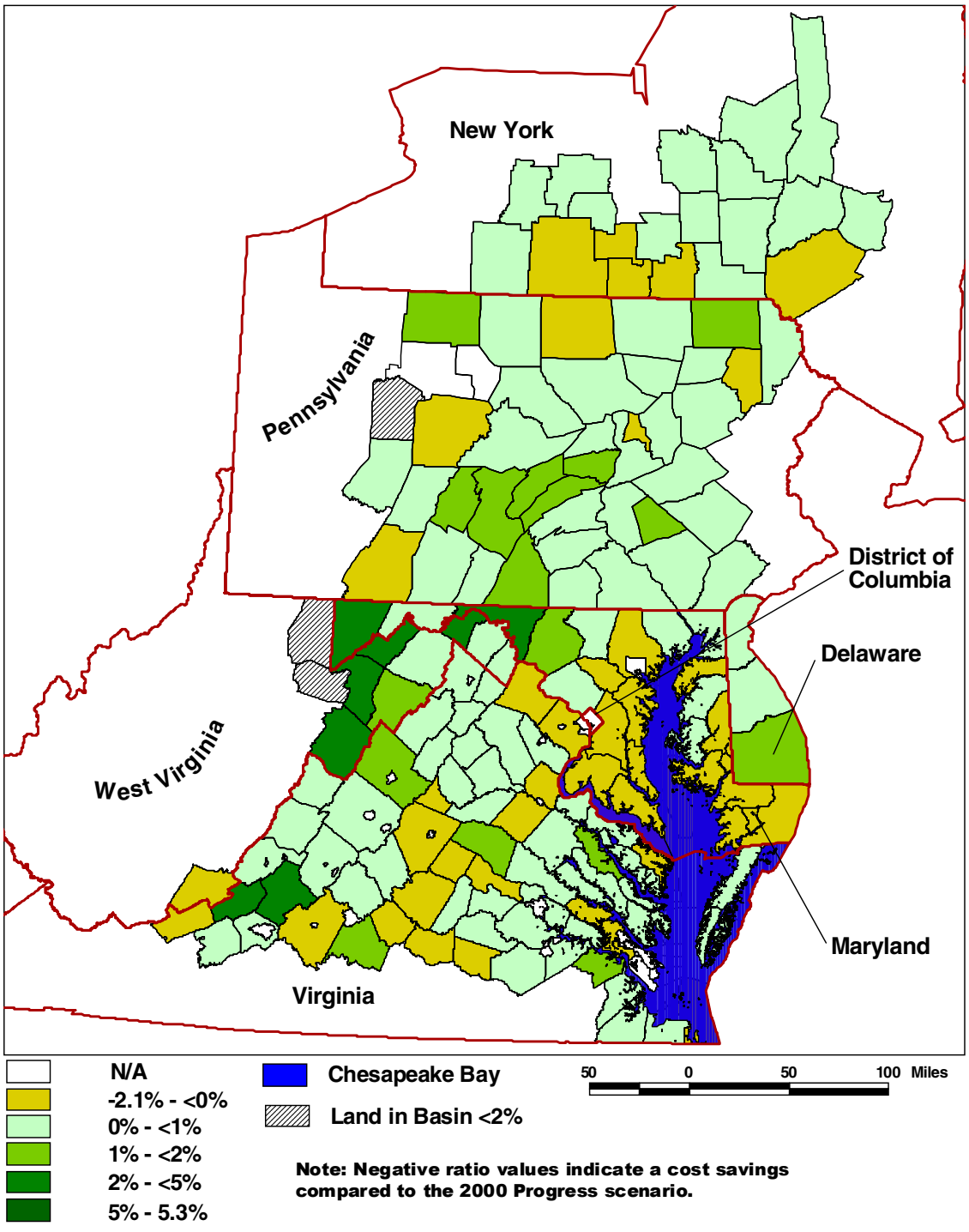


Exhibit H-20: Comparison of Crop and Portion of Hay BMP Costs to Crop and Hay Sales: Tier 1 (Agricultural Sector Screening Variable Values)

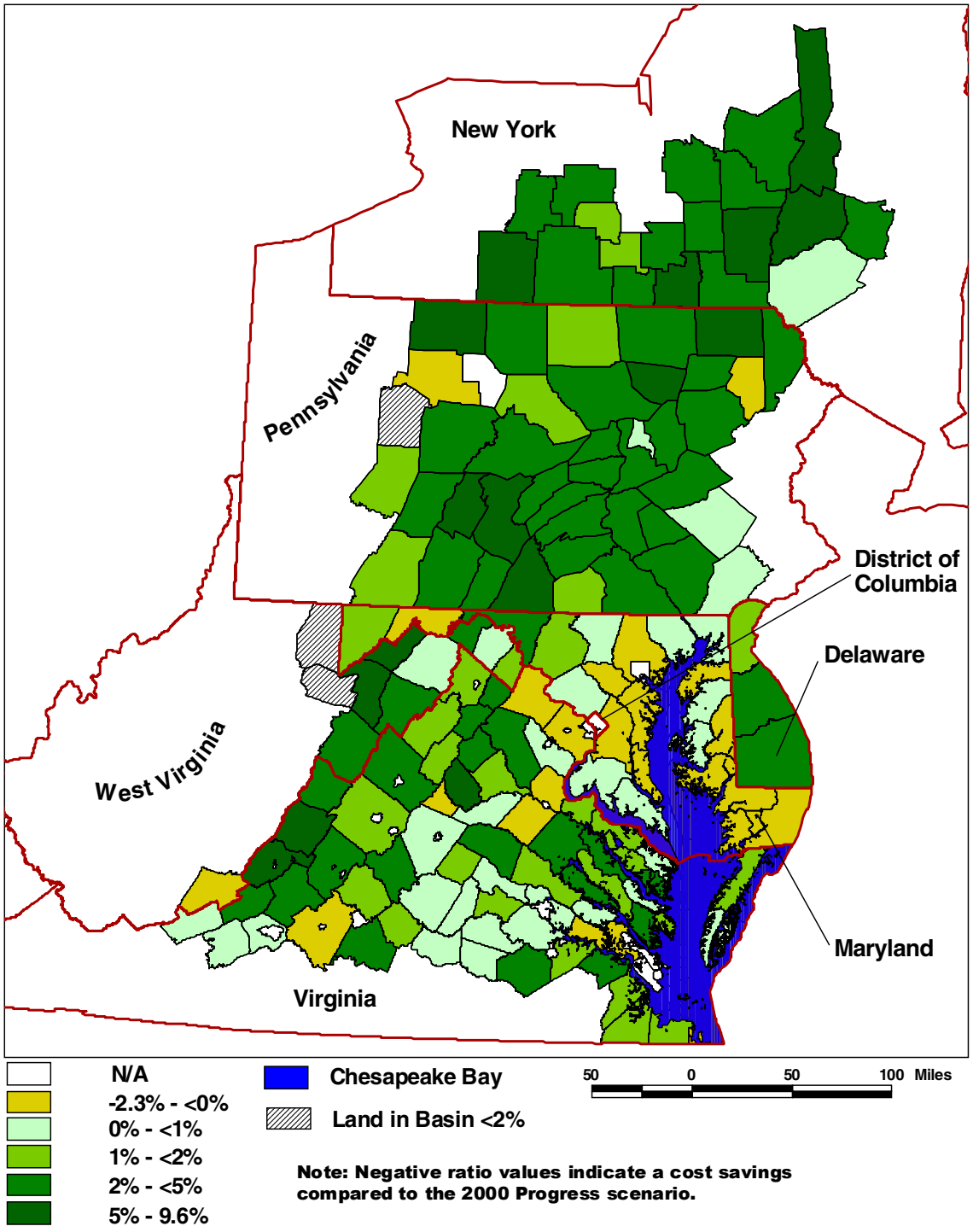
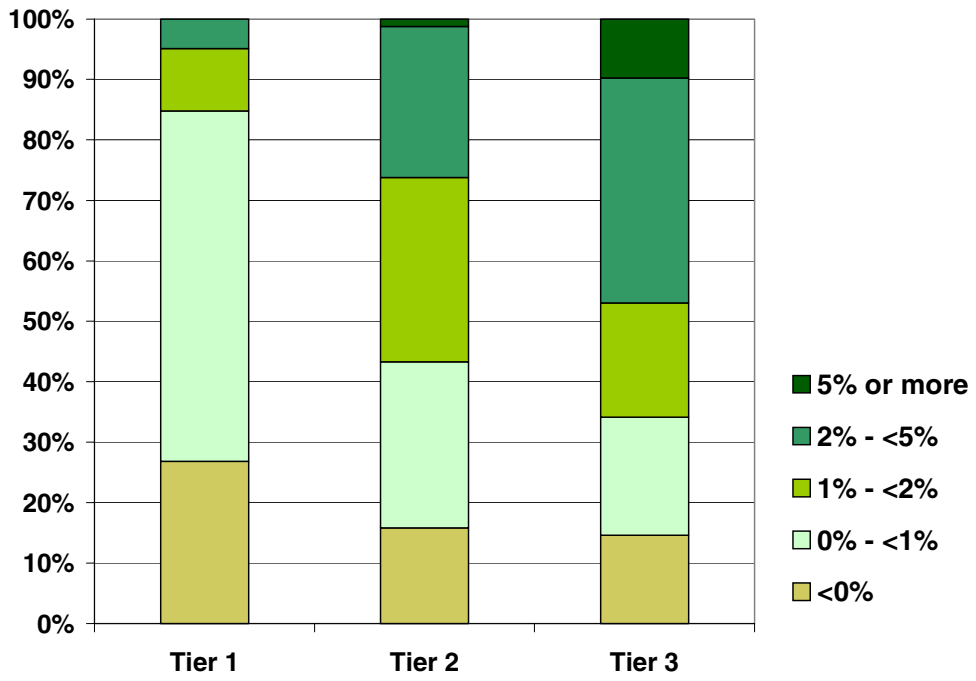


Exhibit H-21: Comparison of Crop and Portion of Hay BMP Costs to Crop and Hay Sales: Tier 3 (Agricultural Sector Screening Variable Values)



Negative values indicate a cost savings compared to the 2000 Progress scenario.

Exhibit H-22: Distribution of Livestock Screening Values by Tier Scenario

Regional maps for Tier 1 (**Exhibit H-23**) and Tier 3 (**Exhibit H-24**) illustrate how the screening variable values change across the compliance scenarios; the map for Tier 2 is in Attachment 3. The largest shift occurs in Virginia, where the variable for many counties is relatively small or even negative in Tier 1, but exceed 5% in Tier 3. This shift primarily reflects a large increase in BMP costs for pasture land such as stream protection and grazing land protection. Other areas with higher Tier 3 screening values include watershed counties in New York, northern and western Pennsylvania, and West Virginia. Unlike Virginia, the higher screening variable values in Pennsylvania are also attributable to higher implementation of animal waste system and manure exporting BMPs, which account for half of private livestock BMP costs in Tier 3. In New York animal waste system BMPs account for about one-third of private livestock BMP costs in Tier 3. In Virginia and West Virginia, the major cost driver is BMPs on pasture land; animal waste system and manure export BMPs account for just 10% of private livestock BMP costs in Virginia and 5% in West Virginia.

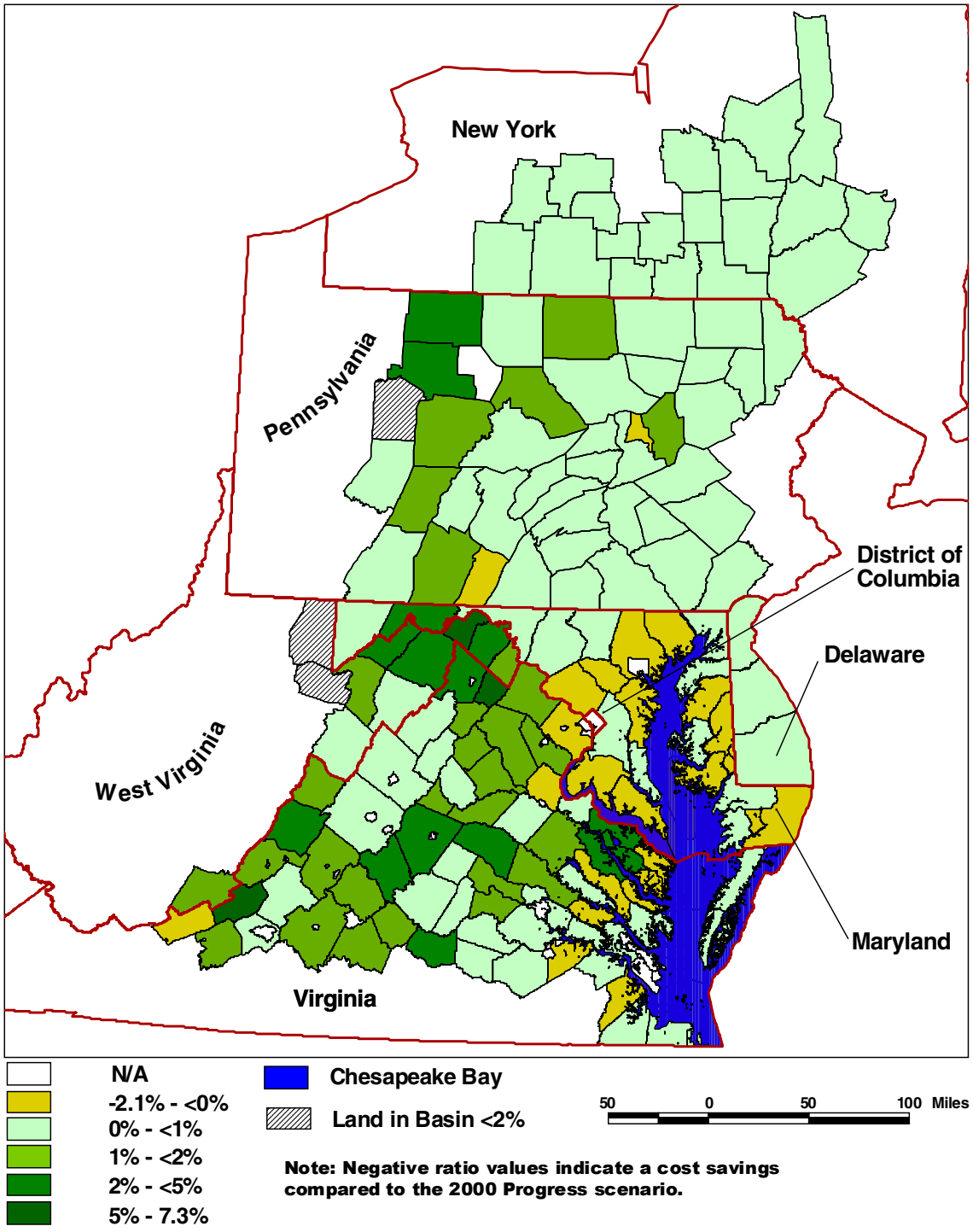


Exhibit H-23: Comparison of Livestock and Portion of Hay BMP Costs to Livestock Sales: Tier 1 (Agricultural Sector Screening Variable Values)

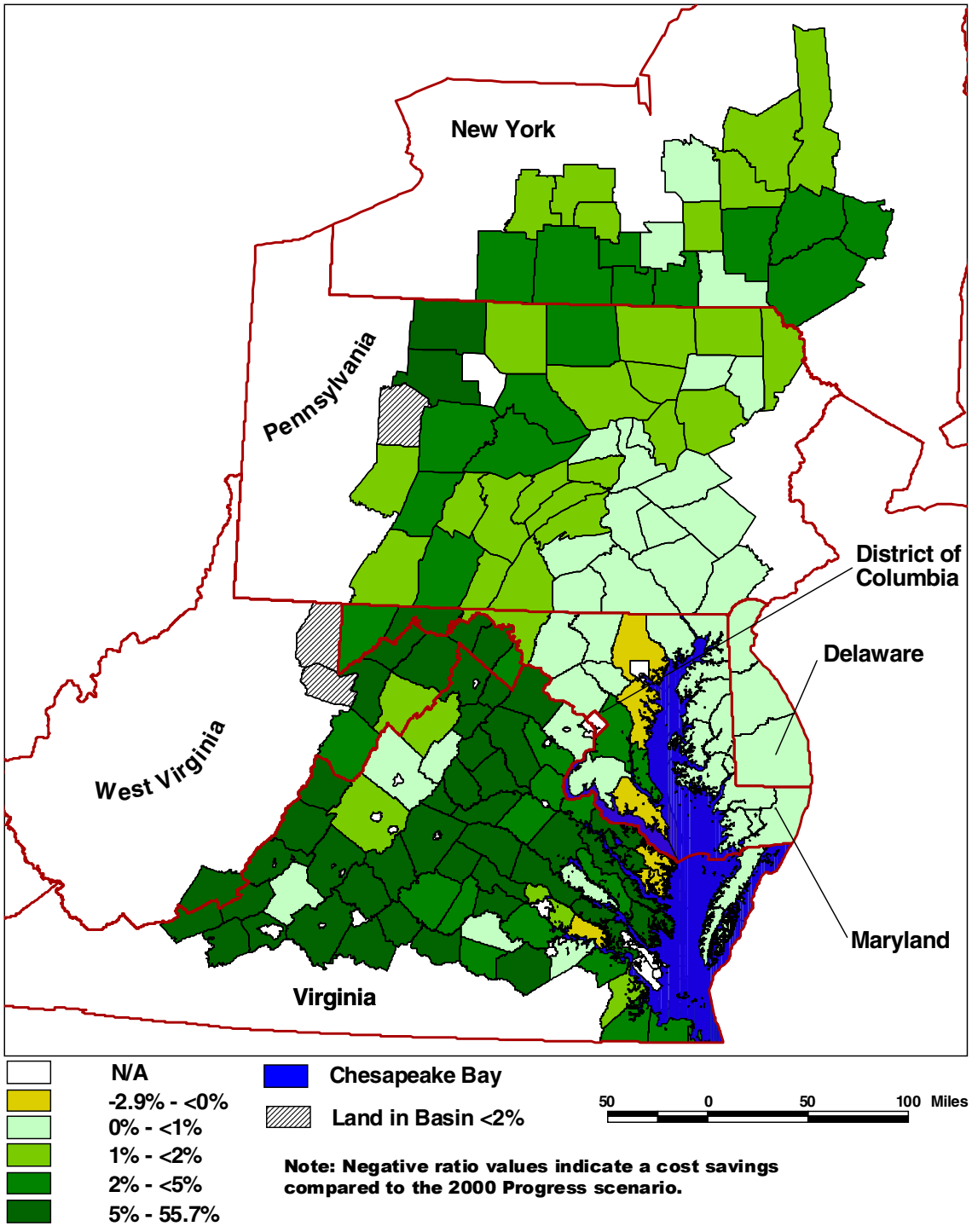


Exhibit H-24: Comparison of Livestock and Portion of Hay BMP Costs to Livestock Sales: Tier 3 (Agricultural Sector Screening Variable Values)

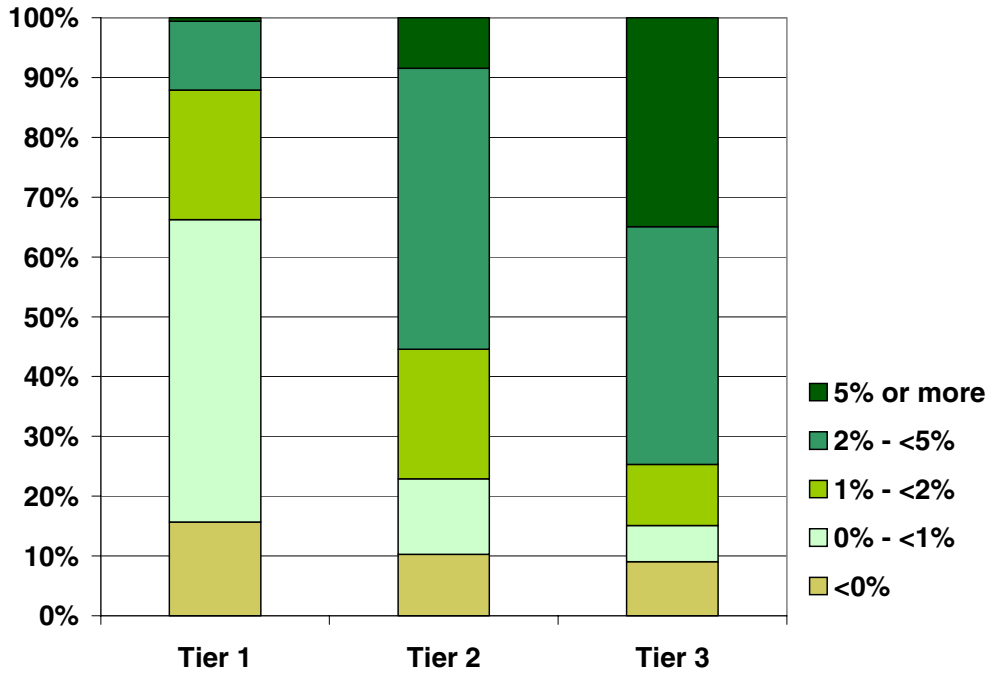
Thus, checking the accuracy of pasture BMP costs is the key validation issue. The higher screening variable values are almost entirely caused by high costs for BMPs on pasture land (streambank protection with and without fencing, grazing land protection, riparian forest buffers on pasture, farm plans on pasture) rather than other livestock BMPs, such as animal waste management and exporting manure out of areas with excess nutrients. This result raises the question of whether the pasture BMP costs in the screening analysis overstate costs. Given the heterogeneous nature of the BMPs (e.g., for grazing land protection) and their uneven application, it is possible that controls need only be applied to an unknown fraction of the acres in the Watershed Model to achieve the runoff reduction on all pasture acres affected by the BMPs (see the groundtruthing analysis in Section 4.4 for further discussion). Documentation for the sources of cost information do not provide a basis for applying costs to a portion of the acres with BMP-related loadings reductions in the Watershed Model. For Pennsylvania, another key issue is how much the animal waste system and manure export costs overlap impacts of the CAFO rule.

The MHI screening variable looks at impacts on households. However, it is important to recognize that there is no benchmark for such a comparison (i.e., what percent of household income business-related expenses can comprise before imposing substantial financial impacts on the household business). Thus, the potential for substantial impacts may be small even when the MHI screening variable values are above 1% or 2%.

Exhibit H-25 summarizes the distribution of MHI screening variable values by tier. The results show that the values are less than 1% in over 66% of counties in Tier 1, approximately 23% of counties in Tier 2, and approximately 15% of counties in Tier 3. Negative values indicate net cost savings, which are primarily due to revenues from State and Federal cost-share programs.[6] High values are not evidence of substantial impact; they merely indicate counties that cannot be screened from further impact analysis on the basis of low BMP cost estimates relative to county MHI. A finding of substantial impact would require additional data and analysis regarding the actual financial impacts on farm households or businesses.

Because the MHI values in the denominator are constant across the tiers, the increase in screening variable values reflects increasing mean BMP costs per farm household. Although BMP costs increase substantially across the tiers (from $74 million in private costs in Tier 1 to $133 million in Tier 3), the per-household cost remains below 5% of MHI for over 92% of households in Tier 2 and 65% of households in Tier 3.

[6] Federal and State cost-share programs do not permit funds provided for installation of BMPs to exceed the installation cost. However, net average costs can be negative because certain cost-share programs provide annual maintenance and one-time incentive payments in addition to the installation cost-share (see Appendix E).



Negative values indicate a cost savings compared to the 2000 Progress scenario.

Exhibit H-25: Distribution of MHI Screening Values by Tier Scenario

The map in **Exhibit H-26** provides a spatial overview of the Tier 1 county-level results for the MHI screening variable. Approximately 12% of counties have values of 2% or higher; these counties tend to be located along the West Virginia-Virginia border, the Virginia shoreline, in Delaware, and in central Pennsylvania. Additional information would need to be collected for these areas to determine if, in fact, substantial impacts are likely. Areas of cost savings compared to the 2000 Progress scenario are evident in coastal Virginia and Maryland. Thus, under Tier 1, most of the jurisdictions in the Bay watershed show little potential for substantial financial impacts. The map of screening variable values for Tier 3 (**Exhibit H-27**) shows much higher screening variable values throughout much of the watershed; the map for Tier 2 is in Attachment 3. Values are least affected in Maryland, where many counties show net negative Tier 3 costs.

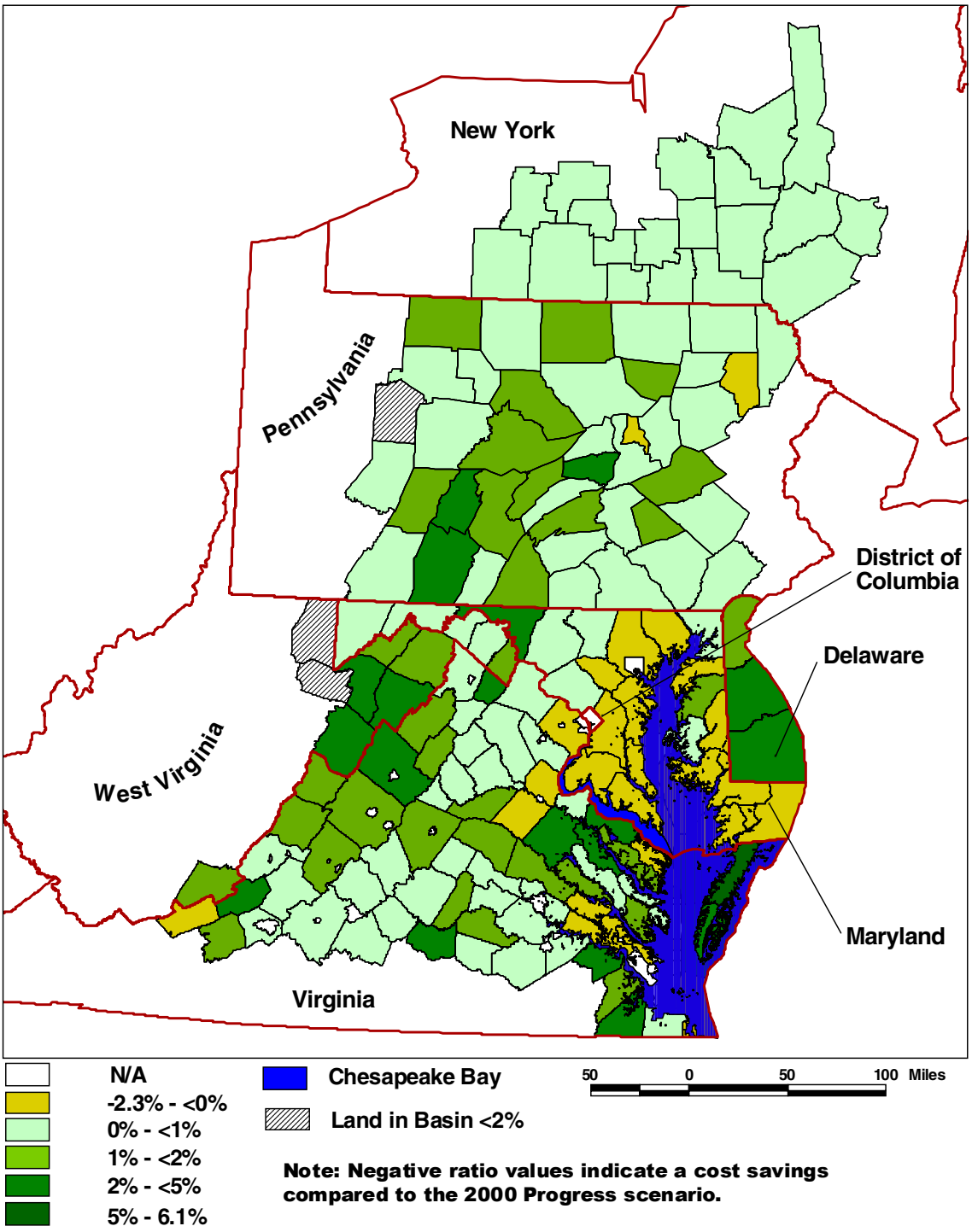


Exhibit H-26: Comparison of Average Agricultural BMP Costs to Median Household Income: Tier 1 (Agricultural Sector Screening Variable Values)

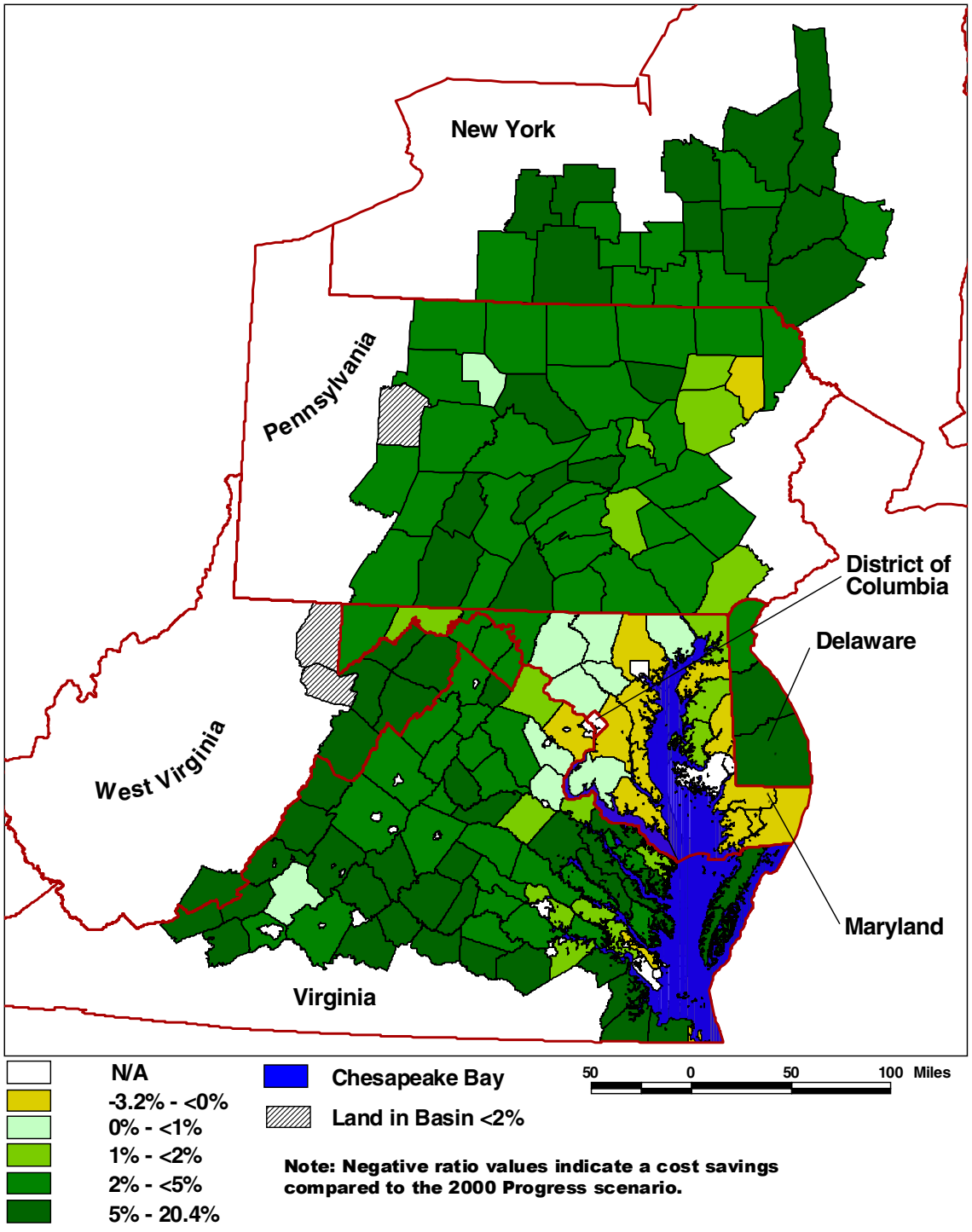
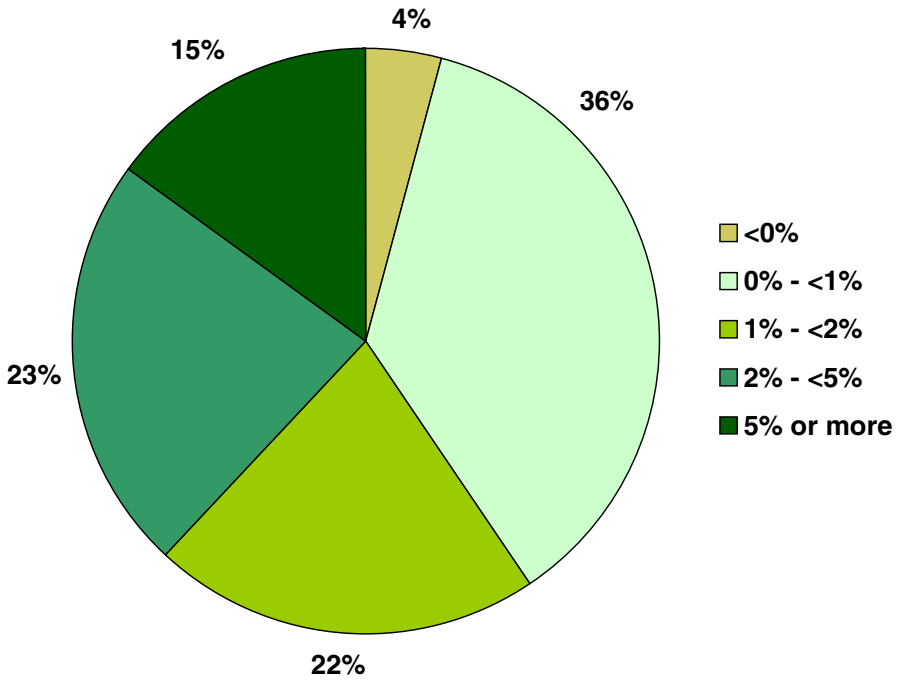


Exhibit H-27: Comparison of Average Agricultural BMP Costs to Median Household Income: Tier 3 (Agricultural Sector Screening Variable Values)

The final screening variable, which indicates counties where widespread economic impacts are unlikely, does not change with the tier scenarios because it is based on an earnings ratio rather than BMP implementation rates. The chart in **Exhibit H-28** shows the percentage of jurisdictions, including the independent cities, in each of the value ranges for the screening variable. Four percent of jurisdictions have negative agricultural income and, therefore, have negative values. Earnings in agricultural and related sectors account for less than 5% of total earnings in 85% of watershed jurisdictions.



Negative values indicate net negative earnings in the agricultural and related sectors.

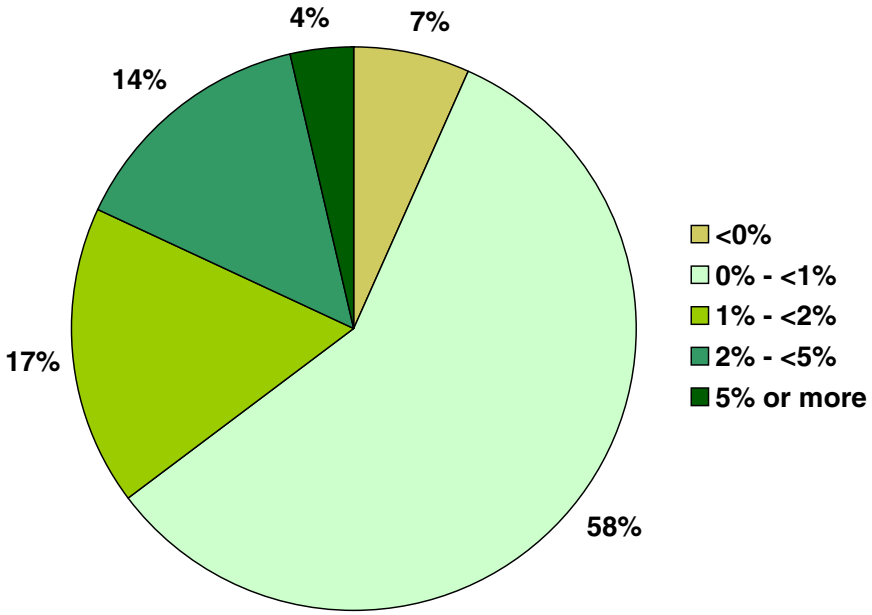
Exhibit H-28: Distribution of Agricultural and Related Earnings Screening Variable Values

There is a slight downward bias in several screening variable values in Exhibit H-28 because of BEA's nondisclosure policies. In 121 of the 197 Basin jurisdictions, the BEA did not release sector-level earnings data for agricultural services for 1999, which indicates that either there were only 1 or 2 agricultural services providers in the county, or one provider accounted for at least 80% of sector earnings. However, given the generally small percentages of earnings derived from agricultural services (ranging from 0.1% to 0.6% for the Basin States), the resulting bias is likely to be small.

Similarly, BEA data on earnings in food and kindred product manufacturing are not disclosed in 75 of the 197 Basin jurisdictions. Again, this indicates that either there were fewer than 3 agricultural services providers in the county or one provider accounted for at least 80% of sector earnings. The proportions of place of work earnings from this sector range from 0% in Washington, D.C. to 1.4% in Delaware and Pennsylvania, so the degree of bias due to nondisclosure is again likely to be small.

The earnings screening variable can overstate the potential for widespread impacts for two reasons. First, the agricultural services sector may actually experience increased income (rather than negative impacts) from BMP implementation. Second, earnings from the food and kindred products sector may not reflect earnings related to crop and livestock production. For instance, Northumberland County, VA has one of the highest values of this indicator (19.6%) because most of the major employers in that county produce and process seafood (J. Gambaccini, Northern Neck Planning District Commission, personal communication, April, 2002). The seafood industry in Northumberland County will not be adversely affected by agricultural BMPs and may, in fact, benefit from improved water quality. The same may be true for other coastal jurisdictions with high indicator values; coastal counties account for half of the counties with screening variable values that exceed 10% and about a quarter of those with values in the 5% to 10% range. Therefore, the screening variable may identify these counties as having widespread impact potential when in fact widespread impacts are unlikely because the related sectors may not be affected by agricultural BMPs or may benefit from water quality improvements.

The potential bias of including the agricultural services and food manufacturing sectors is clear in a comparison of Exhibit H-28 with **Exhibit H-29**. The share of jurisdictions with earnings from farming only (i.e., without the additional sectors included in the results in Exhibit H-28) above 5% declines from 15% to 4%.



Negative values indicate net negative earnings in the agricultural sector.

Exhibit H-29: Distribution of Agricultural Earnings Only Screening Variable Values (with Related Sectors Removed)

The agricultural earnings screening variable cannot be interpreted as a demonstration of widespread impact; it merely shows where there is almost no potential for widespread impact given the broad industry classifications and within the limits of BEA data availability. Because the industry classifications are broad and most of the jurisdictions have data reported for agricultural income and at least one of the two other industries, the jurisdictions (Exhibit H-28) with less than 5% of reported earnings coming from agriculture and related sectors are unlikely to experience widespread impacts even if there are substantial impacts in the agricultural sector under any tier scenario. In particular, some businesses in the agriculture services industry will most likely benefit from the influx of Federal and State funding through cost-share programs. Additional analysis would be needed to demonstrate widespread impacts in the remaining 15% of jurisdictions (Exhibit H-28) with earnings shares above 5%. EPA (1995) guidance lists variables for evaluation to determine whether widespread impacts are likely; the screening analysis serves only to focus such an effort.

The map in **Exhibit H-30** shows the spatial distribution of the widespread indicator values throughout the watershed. The noncoastal jurisdictions with higher indicator values (e.g., greater than 5%) are predominantly located in east-central Pennsylvania and along the West Virginia-Virginia State boundary.

Having screening indicators for both substantial and widespread impacts for agriculture provides an opportunity to evaluate when potential exists for both conditions. The scatter plot in **Exhibit H-31** shows the combined results for the MHI screening variable (Tier 1) and the widespread screening variable for each jurisdiction. Most of the data points are close to the one of the axes, indicating low potential for either type of impact. The MHI variable values that exceed 1% are generally associated with widespread variables below 5%. Similarly, the high widespread screening variable values tend to be associated with MHI variable values that are less than 1%. Thus, under Tier 1, there is little evidence of potential for substantial *and* widespread impacts.

The scatter plots in **Exhibits H-32** and **H-33** show outcomes for the Tier 2 and Tier 3 MHI screening variables, respectively, and widespread screening variables. While more points have a MHI variable value above 1% in Tiers 2 and 3, many of these points have widespread variable values of less than 5%. Thus, although the potential for substantial impacts is higher under Tiers 2 and 3, many jurisdictions are still unlikely to experience both substantial and widespread impacts.

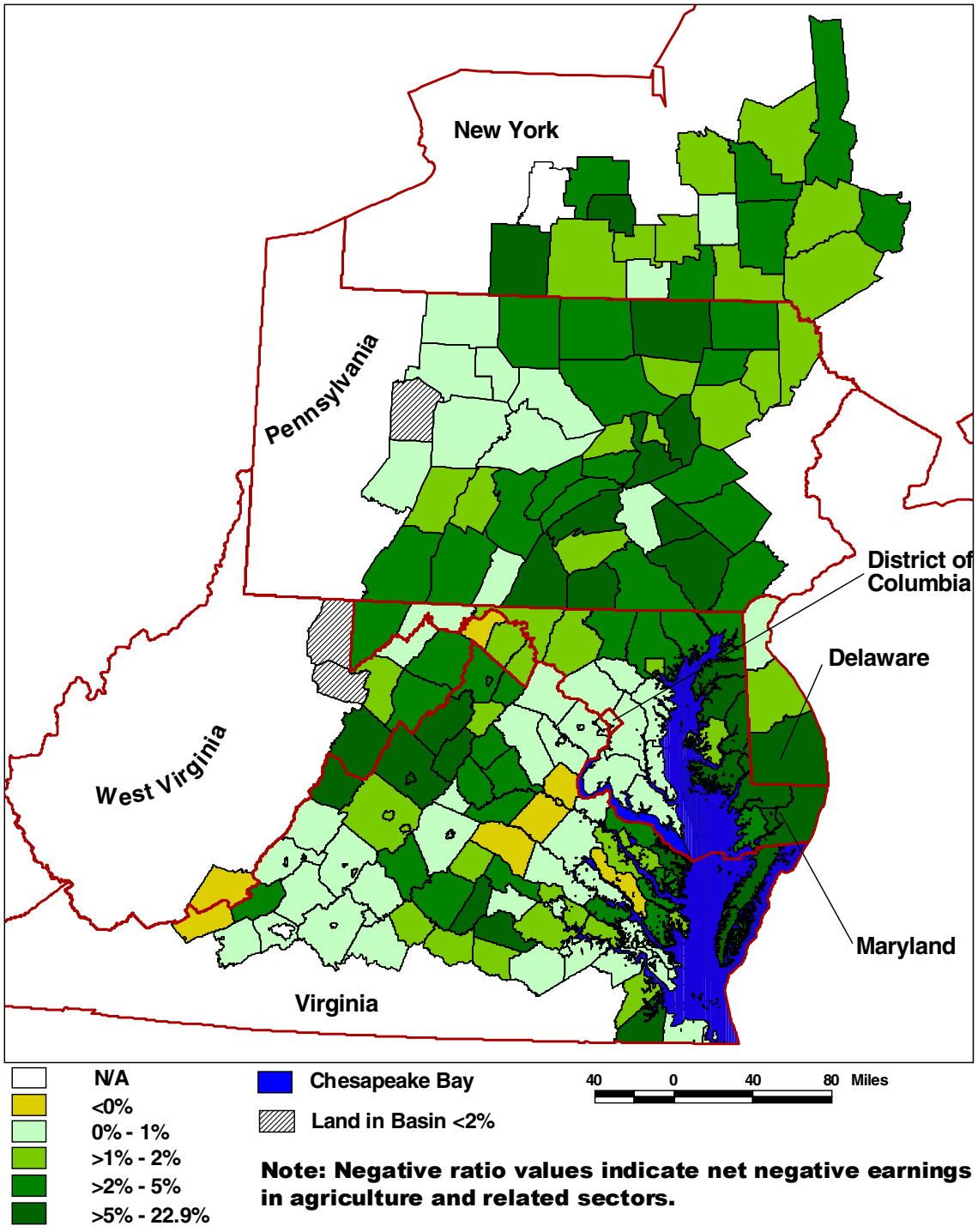


Exhibit H-30: Comparison of Agricultural and Related Earnings to Total Earnings (Agricultural Sector Screening Variable Values)

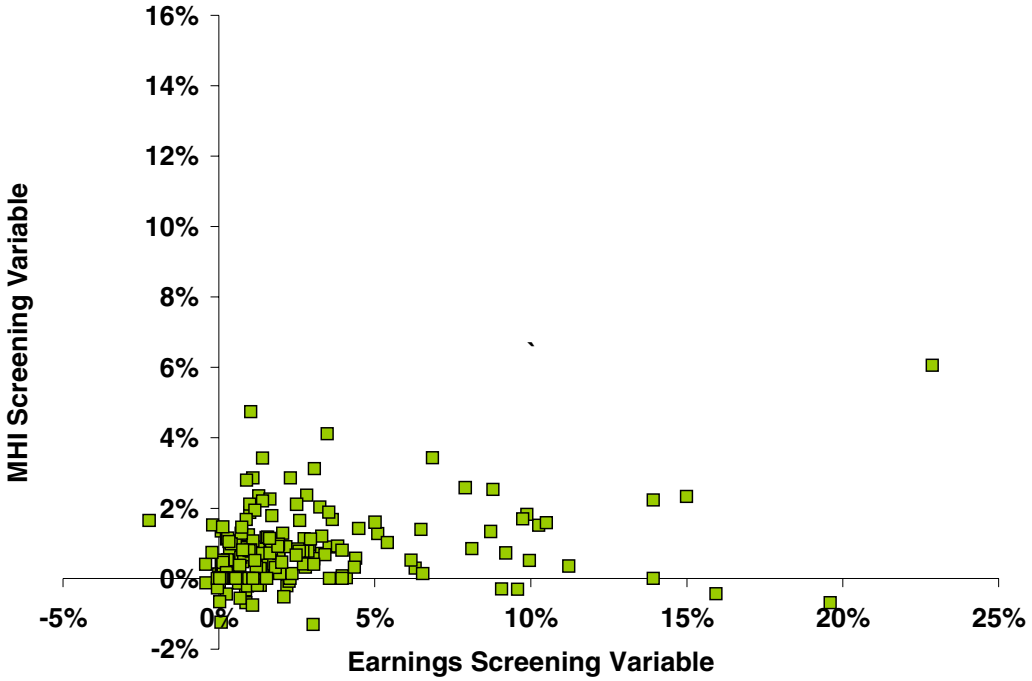


Exhibit H-31: Joint Earnings and MHI Screening Variable Values (Tier 1)

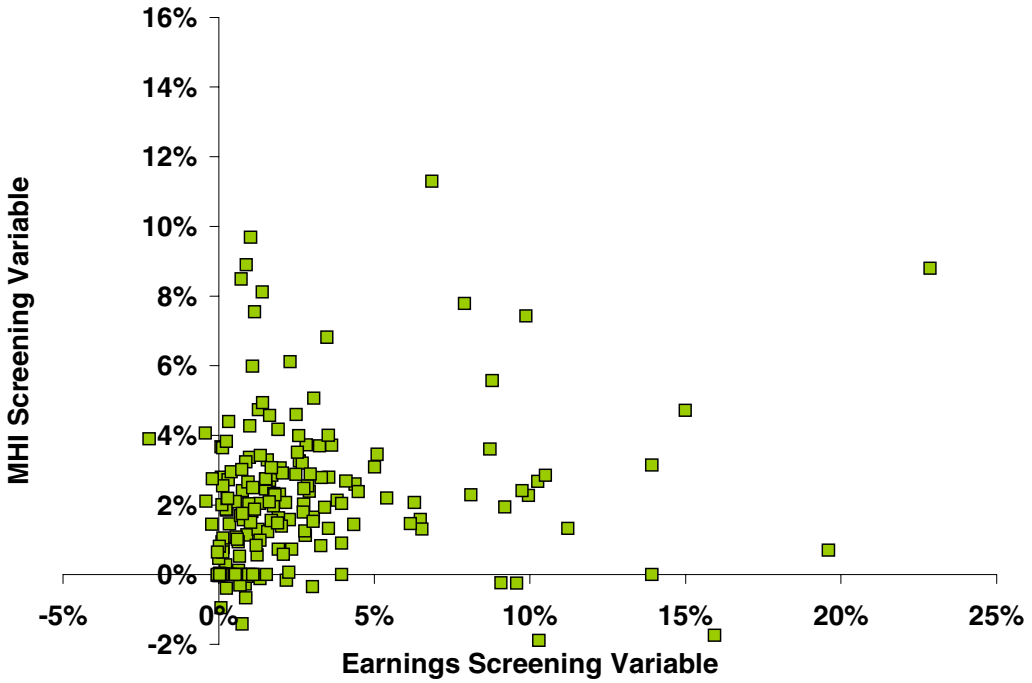


Exhibit H-32: Joint Earnings and MHI Screening Variable Values (Tier 2)

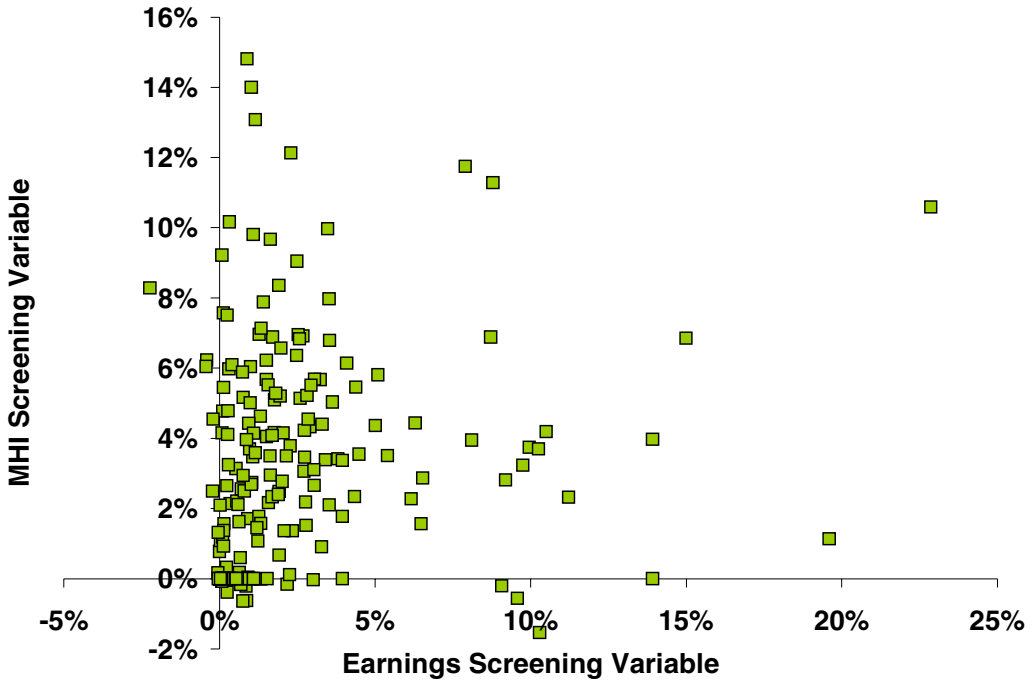


Exhibit H-33: Joint Earnings and MHI Screening Variable Values (Tier 3)

The plots in Exhibits H-32 and H-33 use the original widespread screening variable, which includes earnings in agricultural related sectors. A variable based solely on agricultural income would have substantially fewer scatter points with high widespread variable values. **Exhibit H-34** illustrates the impact using the MHI screening variable values for Tier 3 and the recalculated widespread screening variable. Comparing the two Tier 3 charts shows that most of the scatter points to the right of 5% along the widespread screening variable axis in Exhibit H-33 are no longer present in Exhibit H-34.

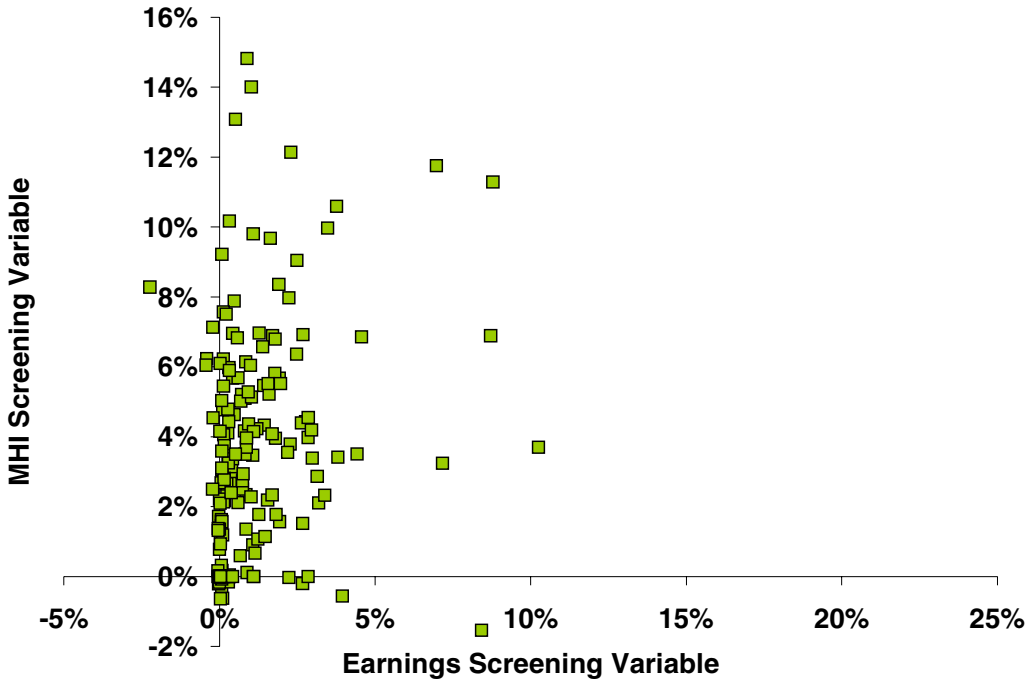


Exhibit H-34: Joint Earnings and MHI Screening Variable Values with Related Sectors Removed (Tier 3)

Exhibit H-35 lists the counties that have initial widespread screening variable values greater than 5% and MHI values greater than 1%. It also shows that all but 6 of the widespread variable values fall below 5% when the related industries are excluded from the widespread screening variable. The counties with values that continue to exceed 5% are primarily located along the Virginia-West Virginia border and southwest of Richmond, VA.

As noted in Section 6.2, the values for the screening variable can be biased for several reasons (see **Exhibit H-36**). For example, the MHI values reflect the assumption that the ratio of BMP costs to MHI in 2010 would be the same as it is in 2001. If household incomes increase more rapidly than BMP costs, then the values are overestimated. Furthermore, all of the variables incorporate current cost share percentages for some BMPs. Changes in the cost share assumptions would alter the values of the screening variables. Lower cost share amounts would increase private costs and variable values, and higher shares would decrease private costs and variable values. Third, BMP costs use constant average unit costs although costs may differ by location. Finally, the screening variable uses county MHI, which may differ from farm household incomes. The USDA reports that, on average, farm households have higher incomes and greater wealth than all U.S. households (USDA, 2002).

Exhibit H-35: Jurisdictions with Earnings Screening Variable Values Greater than 5% and MHI Values Greater than 1%

Jurisdiction	Earnings Screening Variable (including related industries)	Earnings Screening Variable (farm income only)	MHI Screening Variable[1]
Lebanon, PA	5.0%	0.9%	4.4%
Franklin, PA	5.1%	1.8%	5.8%
Perry, PA	5.4%	4.4%	3.5%
Lancaster, PA	6.2%	1.0%	2.3%
Allegany, NY	6.3%	2.8%	4.4%
Queen Annes, MD	6.5%	1.9%	1.6%
Yates, NY	6.5%	3.1%	2.9%
Suffolk, VA	6.8%	0.7%	19.3%
Northampton, VA	7.9%	7.0%	11.7%
Bradford, PA	8.1%	1.8%	3.9%
Cumberland, VA	8.7%	8.7%	6.9%
Pendleton, WV	8.8%	8.8%	11.3%
Columbia, PA	9.2%	0.2%	2.8%
Page, VA	9.7%	7.2%	3.2%
Highland, VA	9.9%	9.9%	17.1%
Northumberland, PA	10.0%	0.2%	3.7%
Amelia, VA	10.3%	10.3%	3.7%
Shenandoah, VA	10.5%	3.0%	4.2%
Adams, PA	11.2%	3.4%	2.3%
Rockingham, VA	13.9%	2.9%	4.0%
Sussex, DE	15.0%	4.6%	6.9%
Northumberland, VA	19.6%	1.5%	1.1%
Accomack, VA	22.9%	3.8%	10.6%

1. The 1% breakpoint used to compile data for this table should not be interpreted as a threshold for analysis for the MHI screening variable. This variable differs from the MPS screening variable used for the POTW analysis, where the 1% threshold comes from EPA (1995) guidance. There are no guidance thresholds for the MHI variable and jurisdictions with values above 1% may not incur substantial impacts.

Exhibit H-36: Sources of Uncertainty in Screening Variables for the Agriculture Sector

Source	Direction of Bias	Comments
Values to not reflect any real growth in MHI or agricultural sales and income.	+	Cost-to-income ratios may be overestimated.
Current BMP cost shares are used to estimate farmer costs.	+	Under the 2002 Farm Bill, cost shares may be higher, which would reduce farmer costs.
Average unit BMP costs are applied to all BMP acres throughout the watershed.	?	Actual BMP costs will vary from site to site.
MHI is for county rather than farm household.	?	Nationally, farm household MHI is slightly greater than overall MHI (USDA, 2002), but this may vary from county to county.
BEA earnings data for agriculture-related sectors is not reported for some counties.	–	Some variable values are slightly lower than they would be had BEA earnings data been complete.
Net cash return and sales data are prorated based on percentage of agricultural land in watershed.	?	Prorating data implies a uniform distribution of sales and net returns over agricultural land; county portions within the watershed may have higher or lower average sales and net returns.
Net cash return plus government payments does not account for depreciation, inventory changes, or noncash benefits (e.g., consumption of farm products).	?	Profit would equal net cash return minus depreciation and net inventory change; depreciation and inventory change are not available from the Census of Agriculture.
Net cash return in 1997 is relatively low for most counties for the period 1996-2000.	+[1]	Impacts on profits should be determined based on three consecutive years so that one bad (or good) year does not generate a false positive (or negative) result (U.S. EPA, 1995).

+ = assumption results in overestimating potential for impacts
– = assumption results in underestimating potential for impacts
? = impact of assumption on indicator values is unknown
1. Potential impact on indicators is positive for most counties and may be zero or negative for others; see comment.

Regarding the cost share assumptions, there is great uncertainty in the extent of costs that will actually be borne by farmers. The 2002 Farm Bill increases Federal overall conservation funding by 80% above the level committed by the last (1996) farm bill. In addition, the new law permits a greater percentage of BMP installation costs (90%, up from 75% in the 1996 bill) to be granted to limited-resource farmers under the Environmental Quality Incentives Program. Therefore, costs paid by farmers may be lower than those used in the screening analysis, and impacts may be overstated. As one example, although specific provisions for the yield reserve BMP in the tier scenarios are not included in the bill, the program may be funded under an innovative technologies clause of the bill (personal communication with T. Simpson, Chair, CBP Nutrient

Subcommittee, May 2002). If implemented, this cost-share program could result in annual incentive payments of $20 to $40 per acre that are not included in the screening analysis. Funding for this program alone would reduce the agricultural costs borne by farmers in Tier 3 by $17 million to $42 million per year.

Also, due to the large number of programs and sources across States, the cost-share information may be incomplete. The cost-share assumptions in the impact analysis are very complex because they vary by state, program, and BMP (see Appendix E). Cost shares may include a variety of contract arrangements including a capital cost share, an annual rental payment, an up-front incentive payment, and an annual maintenance cost. For this analysis, the CBP did not factor in the substantial annual rental payments but instead assumed that they would offset any revenue losses resulting from BMP implementation. If instead, rental payments more than offset any losses (e.g., BMPs are implemented on marginal land such that little revenue is lost), the screening analysis may overstate impacts.

6.4 Groundtruthing of Screening Results

To further evaluate how well the screening variables reflect the likelihood of substantial and widespread impacts, this section provides more comprehensive analysis of the results for Allegany County, MD. **Exhibit H-37** contains a summary of the estimated costs and screening variable values across the modeling scenarios.

Exhibit H-37: Agricultural Costs and Screening Variable Values for Allegany County, MD (2001$)

Estimate	Tier 1	Tier 2	Tier 3
Private Agricultural Costs	83,109	108,304	163,273
State and Federal Agricultural Costs[1]	287,560	488,090	795,238
Till crop plus portion of hay costs as percent of crop and hay sales	0.1%	–1.0%[2]	–2.3%[2]
Livestock plus portion of hay costs as percent of livestock and product sales	3.7%	5.3%	8.5%
Agricultural BMP costs per farm as percent of county MHI	0.9%	1.1%	1.7%
Agriculture and related sector earnings as percent of total earnings by place of work	0.9%	0.9%	0.9%

Source: Draft screening analysis output from November 19, 2002.
1. Assumes that all needed BMPs are cost shared at current rates.
2. Costs are negative (i.e., net income to the farmer increases because of cost-share program funding).

As noted above, some indicator variables in the screening analysis are conservative and, as such, may overestimate potential for impacts.

6.4.1 Crop Sales Screening Variable

The screening analysis indicates that estimated costs for BMPs on cropland represent less than half a percent of the value of crop sales under Tiers 1 and 2, and net revenue increases under Tier 3. **Exhibit H-38** provides a summary of the BMP costs and sales data used to calculate the Tier 3 ratio. The negative value for the till crop screening variable under Tiers 2 and 3 results from a combination of reductions in some BMPs compared to the 2000 Progress scenario (e.g., conservation tillage, nutrient management plan, and farm plans) and net earnings from cost-share program incentive and annual maintenance payments that exceed BMP costs (e.g., forest and grass buffers and land retirement). Thus, BMP-related revenues could actually improve crop-related financial ratios and, therefore, do not currently indicate a substantial negative impact.

Exhibit H-38: Summary of Crop and Livestock BMP Costs and Sales for Allegany County, MD

Item	Cropland[1]	Livestock[2]
BMP Costs for Tier 3 (2001 dollars)[3]	($27,101)	$190,374
Market Sales (1997 dollars)	$1,150,000	$2,172,000
Market Sales (2001 dollars)	$1,185,385	$2,238,831
Ratio of BMP Costs to Sales	-2.3	8.5

1. BMPs include forest buffers, grass buffers, conservation tillage, wetlands restoration, erodible land retirement, carbon sequestration, nutrient management, yield reserve, farm plans, and cover crops.
2. BMPs include forest buffers, wetlands restoration, farm plans, stream protection, and grazing land protection. (There are no costs for livestock BMPs, animal waste management systems and excess manure hauling, because the Watershed Model does not apply these BMPs in Allegany County under any tier scenario.)
3. The cost of BMPs for hay land is split between crops and livestock based on the shares of crop and livestock sales in the county. In Allegany County, sales of livestock and livestock products accounts for about 65% of total sales and hay BMP costs are $4,220. Thus, livestock BMP costs include $187,615 for pasture BMPs plus $2,759 in hay costs (about 65% of total hay BMP costs); cropland BMP costs include negative $28,562 for cropland BMPs plus the remaining hay BMP costs of $1,461 ($4,220–$2,759).

6.4.2 Livestock Sales Screening Variable

The preliminary economic framework indicates that potential costs for livestock-related BMPs represent 3.7% to 8.5% of sales from livestock and livestock products in the county. Exhibit H-38 shows the BMP costs and sales data used to calculate the ratio for Tier 3. Because profit data are not available at the sector level, it is unknown whether the livestock subsector is initially profitable.

Livestock BMP costs include $136,508 for streambank protection on 3,620 acres (with or without fencing) and $53,705 for grazing land protection on 5,376 acres; there are no animal waste BMPs (i.e., animal waste management systems or excess manure hauling) required under Tier 3. The degree of pasture land BMP implementation may be excessive given the number of animals in the county that are typically pastured, and their distribution by farm size category.

Detailed information from the 1997 Census of Agriculture in **Exhibit H-39** indicates that most farms with either cattle or sheep have fewer than 100 animals. Thus, this source indicates that the livestock industry is not concentrated at a few large farms with high intensity grazing. Furthermore, a comparison of the total number of animals in Exhibit H-39 with the amount of grazing land being protected in Tier 3 suggests the possibility that either grazing intensity is generally very low, which implies that the unit BMP cost per acre overstates likely costs for this county, or that intense grazing occurs on relatively few acres, which implies that BMP acres are overstated. Because livestock BMP costs are driving the MHI screening variable value in Exhibit H-35, any question regarding the accuracy of these costs extends to this indicator as well.

Exhibit H-39: Livestock Distribution in Allegany County, MD

Category	Total Animals in 1997	Number of Farms with Animals (total animals)					
		1–9 Animals	10–19 Animals	20–49 Animals	50–99 Animals	100–199 Animals	200–499 Animals
Cattle & calves inventory	5,341	34 (191)	43 (D)	35 (1,076)	27 (1,839)	12 (1,442)	1 (D)
Sheep & lambs inventory[1]	241	8 (114)		3 (127)		0 (0)	0 (0)

Source: 1997 Census of Agriculture.
D = Withheld to prevent disclosing data for individual farms.
1. The size thresholds for sheep differ slightly; the smallest size category is 1–24 animals and the next smallest is 25–99 animals.

6.4.3 MHI Screening Variable

The screening analysis indicates that total potential per farm BMP costs represent between 0.9% and 1.7% of MHI in the county. Data on large and corporate farms in Allegany County indicates that most farms are both small and operated by families, individuals, or partnerships rather than corporations. The 1997 Census of Agriculture reported that only one of the 239 farms in Allegany County met the USDA definition of "large" (i.e., over $250,000 in sales), and only 3 were corporation owned (all by family corporations). Because 99.6% of the farms in the county are small farms and 98.8% are not corporate, this variable is more relevant to farm financial conditions and, therefore, is a useful indicator of whether farms in Allegany County would not experience substantial financial impacts.

Based on the screening analysis results, it appears that there is little potential for substantial impacts. Total BMP costs are small relative to household incomes, and the crop sector potentially has net cost savings. Although the livestock variable is higher, the pasture BMP costs appear to be overstated for the number of animals in the county.

7. URBAN SOURCES

As described in Appendix E, controls for urban sources in the Watershed Model include riparian forest buffers, environmental site design, storm water retrofits, storm water management on new and recent development, urban nutrient management, urban growth reduction, and forest conservation. These practices apply to pervious and impervious urban land, as well as mixed open land, which represents herbaceous land not classified as agricultural, forest, or urban (such as parks and golf courses). Urban controls are likely to be implemented by municipal governments, which will pass on costs to households in the form of taxes and fees.

EPA (1995) guidance provides preliminary and secondary tests of whether such costs would result in substantial impacts on the public sector (the preliminary test acts as a trigger for performing the additional, more data intensive secondary test), and a list of variables to evaluate to determine if such impacts will also be widespread (see Section 3.1). Data and methods for determining if impacts will be widespread are complex, and best accomplished with regional economic models. Data to conduct the secondary test of substantial impact would also be difficult to collect for the entire watershed, however, information for EPA's preliminary test is more readily available. Therefore, this test can be performed as a first step in focusing additional analysis so that resources are not devoted to data collection for areas that clearly will not face any substantial impacts.

7.1 Tests of Substantial and Widespread Impact

The preliminary test for substantial impacts on the public sector in EPA (1995) guidance is the MPS, which is described in Section 3.1. The secondary test builds upon the characterization of financial burden identified in calculating the MPS. If the preliminary and secondary tests indicate there will be substantial financial public sector impacts, then there are three steps for determining whether such impacts are expected to be widespread.

7.2 Screening Variables

As a first step in narrowing down data collection efforts, a screening variable can be constructed to represent the MPS due to urban source controls at the county level:

- Urban BMP costs per urban household as a percent of county MHI

and may reflect a conservative or high per-household cost if controls on mixed open land (e.g., parks, golf courses) are implemented and paid for at the county level and, therefore, spread over a larger population base.

The number of urban households is based on urban population data from the 2000 Census of Population and Housing (U.S. Census Bureau, 2002). In the 2000 Census, urban areas include incorporated cities, towns, and villages and unincorporated Census-designated places with 2,500 or more people, plus "urbanized areas" and "urban clusters" (i.e., fringes of urbanized areas).

For each county, urban households in the watershed in 2010 is based on the 2000 Census data on urban population, the proportion of the county population within the watershed, population projections to 2010 using a methodology developed by the CBP, and the number of people per household from the 2000 Census (see Attachment 1). The implicit assumptions in this method are:

- The proportion of urban population in the watershed is equal to the proportion of total population in the watershed
- Urban population growth from 2000 to 2010 is equal to overall population growth within the watershed.

MHI at the county level is from the 2000 Census of Population and Housing (U.S. Census Bureau, 2002), adjusted to 2001 dollars using the CPI (BLS, 2002).

7.3 Screening Results

Exhibit H-40 provides a summary of the urban screening variable values by tier scenario. In Tier 1, only 1% of jurisdictions incur costs that exceed 1% of MHI, indicating that 99% of jurisdictions are not likely to experience substantial impacts due to urban BMPs. In Tier 2, screening variable values are slightly higher in a few jurisdictions, but almost 95% still have values below 1%. In Tier 3, about 79% of jurisdictions have screening variable values in the 0% to 1% range; another 13% have values in the 1% to 2% range. The remaining 8% have variable values above 2%. The screening variable values can show where substantial impacts are unlikely to occur, but they cannot be used to demonstrate substantial impacts. Analyses similar to the secondary test for POTWs would be needed to show substantial impacts. Furthermore, a widespread test is also required to show socioeconomic impacts such as reduced personal income and increased unemployment.

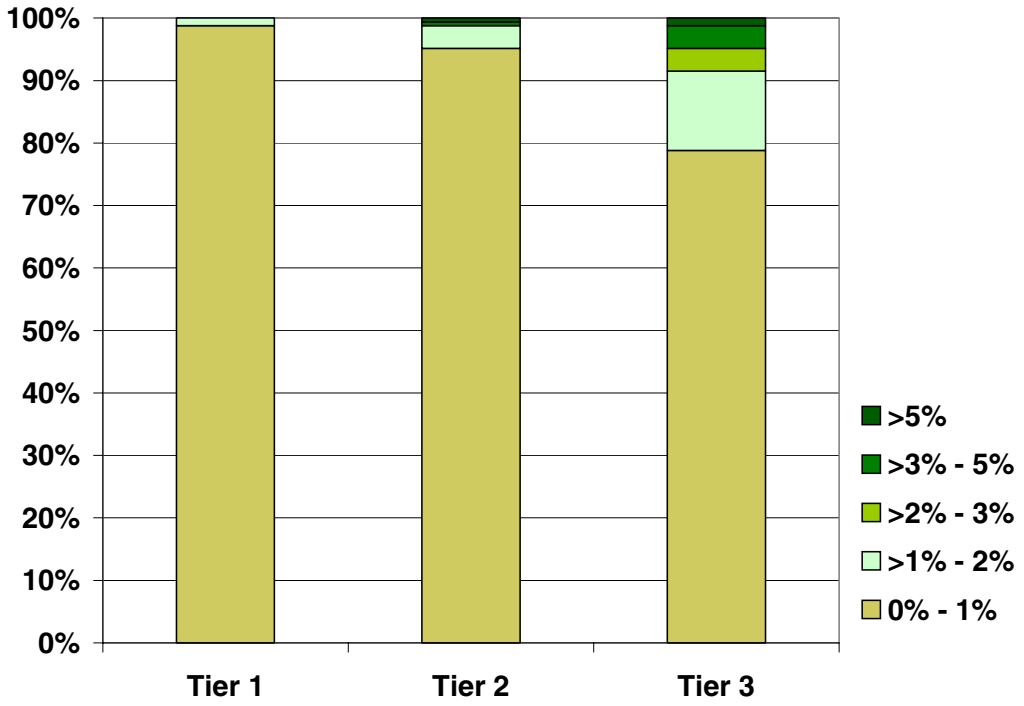


Exhibit H-40: Distribution of Urban Screening Variable Values by Tier Scenario

The Tier 3 results reflect the impact of high stormwater retrofit costs (approximately $377 million per year). Because the retrofit costs account for almost 89% of annual costs, the screening variable values are highly dependent on those costs. Consequently, it is important to consider a few sources of upward bias in these estimates. First, the retrofit costs used in the screening analysis are high compared to other regional estimates. Thus, the screening analysis generates a high estimate of the number of jurisdictions potentially triggering a secondary test. Second, the retrofit costs do not include any Federal or State cost share funding and they do not reflect "piggy back" opportunities that would reduce implementation costs. These factors contribute to the likelihood that costs and screening variable values are overstated. Finally, many of the counties with high screening variable values tend to have small urban populations in the Bay watershed compared to the number of urban retrofit acres (**Exhibit H-41**). This raises a question about either the accuracy of assuming constant average unit control costs for all acres or the method used to allocate population among urban and nonurban categories. Furthermore, 32 counties have zero urban population according to the 2000 Census and, therefore, have no urban population estimates in 2010 (Exhibit H-41). Nevertheless, the watershed model indicates urban BMPs would be applied. Exhibit H-40 excludes these counties because the screening variable value cannot be calculated.

Additional sources of uncertainty include the assumption that urban MHI estimates are comparable to county MHI estimates, and assumptions made to derive urban population

estimates from Census and CBP data. These assumptions include that urban population growth rates equal overall county population growth rates, and that populations are evenly spread out in counties that are partially in the watershed (e.g., if 45% of county population is in the watershed, then 45% of the urban population is in the watershed). Finally, there is no attempt to incorporate real growth in MHI because projections are not available. If urban incomes rise more rapidly than prices in general between 2001 and 2010, then the values of the screening variable are overestimated, and vice versa.

The spatial distribution of screening variable values for Tier 1 (**Exhibit H-42**) shows that the two counties with values above 1% are Goochland, Virginia (1.05%), and McKean, Pennsylvania (1.01%). Both values are very close to 1% and may indicate that substantial impacts are unlikely. Also note that both counties are listed in Exhibit H-41 as having relatively low urban populations, particularly compared to Tier 3 BMP implementation, which raises a question about whether the BMP cost estimates have an upward bias. For Tier 3 (**Exhibit H-43**), counties with higher screening variable values tend to be located in inland areas where population density tends to be lower. Counties that do not have urban populations appear white on the maps because the indicator is not applicable to those counties.

Again, the screening variable values serve only to focus any subsequent data collection and analysis of impacts. Confirming that costs are based on the most cost-effective control strategy, and conducting EPA's secondary test, would be necessary to determine if impacts are substantial. The screening analysis does not attempt to identify areas where substantial impacts could also result in widespread adverse impacts on the community. Analysis of widespread impacts for public sector entities is described in Section 3.1.

Exhibit H-41: Counties With Low or Zero Urban Households (2001$)

County	2010 Urban Households	Urban BMP Costs[1]	Mixed Open BMP Costs[1]	Urban and Mixed Open BMP Costs per Urban Household
Garrett, MD	353	$123,815	$4,745	$364
Fulton, PA	0	$112,299	$8,711	n/a
Jefferson, PA	0	$22,984	$247	n/a
McKean, PA	7	$3,353	$445	$543
Potter, PA	0	$64,091	$39,015	n/a
Sullivan, PA	0	$81,671	$37,765	n/a
Amelia, VA	0	$104,888	$13,155	n/a
Appomattox, VA	0	$192,873	$5,657	n/a
Bath, VA	0	$150,116	$5,103	n/a
Buckingham, VA	0	$214,330	$17,435	n/a
Caroline, VA	0	$336,518	$15,767	n/a
Charles City, VA	0	$37,715	$4,205	n/a
Craig, VA	0	$26,434	$2,223	n/a
Cumberland, VA	125	$120,646	$10,735	$1,051
Goochland, VA	384	$425,780	$13,010	$1,143
Greene, VA	0	$205,180	$6,043	n/a
Highland, VA	0	$47,836	$8,486	n/a
King and Queen, VA	0	$54,701	$7,092	n/a
King George, VA	0	$330,038	$6,111	n/a
Lancaster, VA	0	$115,533	$5,337	n/a
Louisa, VA	0	$318,911	$17,426	n/a
Madison, VA	0	$482,391	$6,928	n/a
Mathews, VA	0	$96,519	$5,557	n/a
Middlesex, VA	0	$90,929	$5,341	n/a
Nelson, VA	0	$242,694	$10,319	n/a
New Kent, VA	0	$251,407	$5,421	n/a
Northampton, VA	0	$114,348	$4,523	n/a
Northumberland, VA	0	$125,719	$7,035	n/a
Rappahannock, VA	0	$232,370	$6,571	n/a
Rockbridge, VA	291	$615,282	$12,085	$2,156
Surry, VA	0	$99,517	$4,014	n/a
Hampshire, WV	0	$291,341	$7,850	n/a
Hardy, WV	0	$199,913	$5,820	n/a
Morgan, WV	0	$164,703	$5,636	n/a
Pendleton, WV	0	$132,863	$6,697	n/a

n/a = result is undefined.

1. Estimated based on acres of urban BMPs in the Watershed Model and the unit cost (in $/acre) for each BMP (see Appendix E).

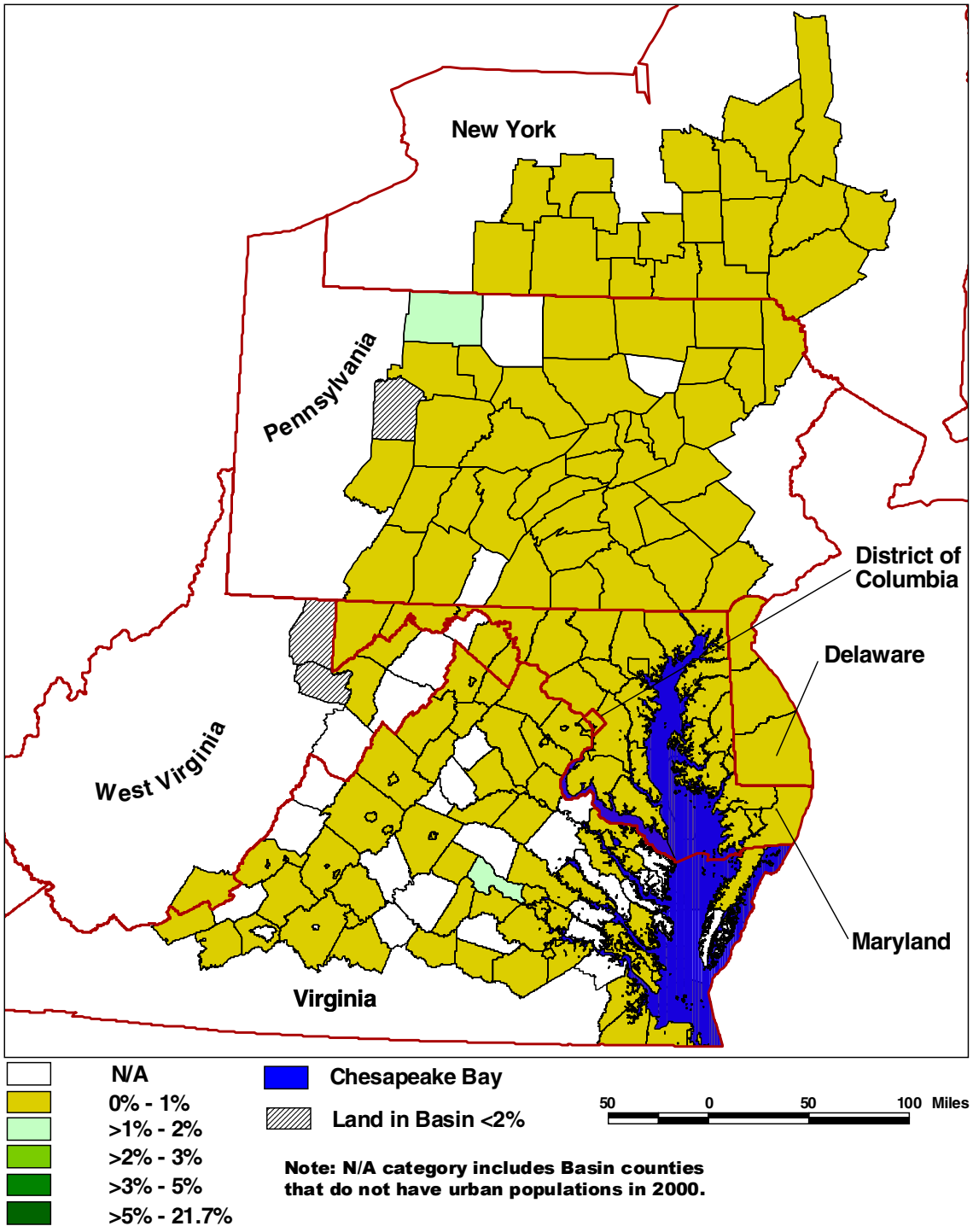


Exhibit H-42: Comparison of Average Household Urban BMP Costs to Median Household Income: Tier 1 (Urban Screening Variable Values)

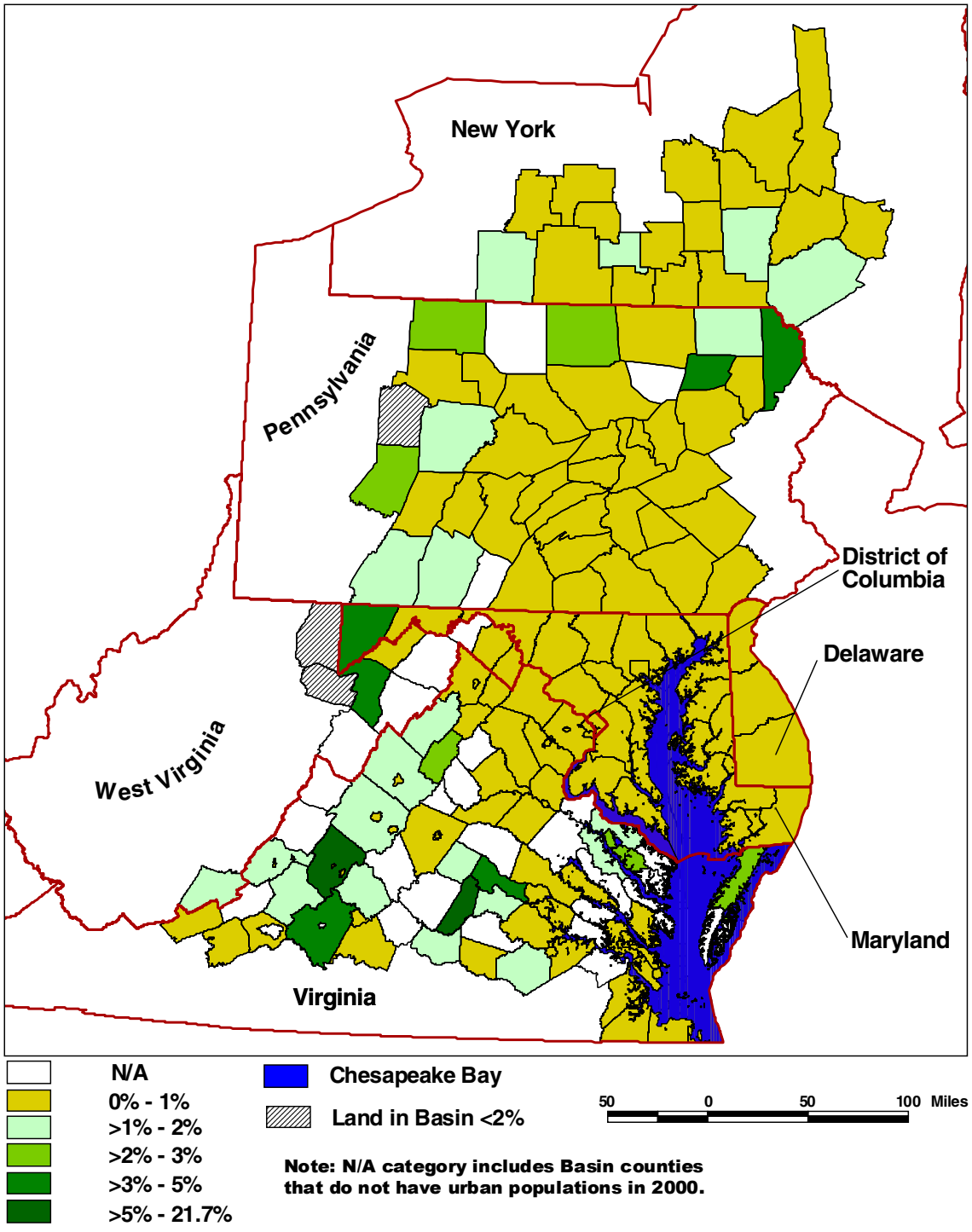


Exhibit H-43: Comparison of Average Household Urban BMP Costs to Median Household Income: Tier 3 (Urban Screening Variable Values)

7.4 Groundtruthing of Screening Results

To continue to investigate how well the urban screening variable functions to focus the analysis away from areas not likely to experience substantial and widespread impacts, this section provides more comprehensive analysis of the results for Allegany County, MD.

Exhibit H-44 provides a summary of the estimated costs and urban screening variable across the modeling scenarios. Costs for urban areas range from $0.3 million under Tier 1 to $2.6 million under Tier 3, with the higher Tier 3 costs reflecting the more costly retrofitting of urban areas with storm water controls. The screening variable value incorporates an estimate of 19,386 urban households in Allegany County in 2010. Nonetheless, household costs for BMPs on urban and mixed open land represent less than half a percent of household income in Allegany County under all tiers, indicating that substantial and widespread impacts from urban source controls are not likely.

Exhibit H-44: Urban Screening Data for Allegany County, MD (2001$)

Estimate	Tier 1	Tier 2	Tier 3
Urban and Mixed Open Costs	$334,503	$854,364	$2,572,116
Urban BMP costs per household as percent of county MHI	0.0%	0.1%	0.3%

Source: Draft screening analysis output from November 19, 2002.

8. ONSITE WASTEWATER MANAGEMENT SYSTEMS (OSWMSS)

The BMP in the Watershed Model for onsite wastewater management systems (OSWMSs) is denitrification plus more frequent pumping. The tier scenarios specify this control as an upgrade for a very small percent of existing systems, and as the selected technology for all new OSWMSs anticipated in the watershed by 2010. OSWMSs are most common in rural areas, but households designated as urban by the Census also have OSWMSs. For instance, many of the "independent cities" of Virginia, cities that also function as counties, contained households served by septic systems or cesspools according to the 1990 Census (U.S. Census Bureau, 1993).

8.1 Tests of Substantial and Widespread Impact

BMP costs will be likely paid by individual households, although the possibility exists for Federal, State and local assistance in the form of grants, cost-shares, and low- or no-interest loans. Thus, a screening analysis that compares per-household costs to MHI can indicate where household-level impacts are not likely to be substantial. This approach is similar to the preliminary test or MPS calculation in EPA (1995) guidance for public sector costs. Nevertheless, similar to the MHI screening variable for the agricultural sector, there is no reason to believe that the MPS thresholds are applicable to this MHI variable.

The screening analysis pertains to BMP costs incurred by existing households. BMP costs for buyers of new homes are not expected to have an economic impact for the following reasons. For new households, capital costs for the BMP will be rolled up in the overall mortgage and one of two situations are likely. In some markets, developers will be able to easily pass the incremental capital cost on because homeowners will not experience substantial financial impacts from the small increase in monthly mortgage payments (approximately $43 including interest). In other markets, homeowners may receive a slightly different mix of features in a home to keep the mortgage cost from increasing at all. However, there is no information indicating that this latter group of future homeowners in the watershed prefer certain features of a home (which could increase overall costs, such as energy costs associated with additional height or square footage) over updated OSWMS technologies needed to improve Bay water quality. Also, since it is not possible to predict the ultimate effect of this requirement on other suppliers to the homebuilding industry (e.g., whether increased purchase of OSWMS technology results in decreased purchases of other home building supplies, and whether affected suppliers are located in the watershed) without a regional model and numerous assumptions, the screening analysis does not evaluate potential for impacts as a result of controls for new homes.

Another cost for buyers of new homes is the incremental O&M cost of the BMP. The average monthly cost is approximately $41, which includes $11 for electricity to operate the system, and $25 for a maintenance contract that may not be required in all areas. Depending on the technology installed, monthly electricity costs can vary from less than $2 to a high of $20. The total monthly O&M cost of $41 also includes about $5 per month to cover the triennial septic system pumping. Because any septic system installed to replace an existing onsite treatment system that has failed would require regular pumping, this portion of costs more accurately represents a baseline maintenance cost rather than an incremental cost of the BMP.

Nevertheless, depending on the technology used and whether a maintenance contract is needed, the monthly O&M cost could be as low as $7 ($2 for electricity and $5 toward triennial pumping). Buyers of new homes can consider these costs when they make home purchase decisions, and builders can consider costs when they make technology decisions. Therefore, the incremental O&M cost will be either inconsequential or, if it might adversely affect a purchase, builders can select the lowest cost technology and alter the mix of home features to reduce annual maintenance costs elsewhere in the home (e.g., lower maintenance exterior or interior materials, lower maintenance landscaping, and reduced home heating and cooling demands).

8.2 Screening Variables

A screening variable can be constructed similar to the MPS for households using onsite waste management systems:

- Average per household BMP cost as a percent of county MHI.

Few households (i.e., less than 1% of existing onsite systems under Tier 3) are expected to incur increased costs as a result of onsite system BMPs. Therefore, even if impacts were found to be substantial, they not likely be widespread. Thus, another screening variable can be constructed to represent the share of households affected:

- Number of households in the county implementing septic system BMPs in 2010 divided by 2010 households in the portion of the county within the watershed.

The number of households in the county within the watershed in 2010 is based on the Bay Program's data on 2000 population, data from the 2000 Census on population per household (U.S. Census Bureau, 2002), and the Bay Program's 2010 population projections (see Attachment 1).

8.3 Screening Results

Tier 3 is the only control scenario that includes the onsite system BMP for existing systems. For this scenario, 23% of counties have MHI screening variable values below 2%; 61% have indicator values in the 2% to 3% range; and 16% have variable values in the 3% to 4% range. These results reflect no funding to offset costs.

The widespread screening variable is based on the share of households affected by this BMP. All counties fall in the 0% to 1% range for this variable; the maximum value is 0.8% (Mathews, Virginia). Thus, it is unlikely that any jurisdiction would experience substantial and widespread impacts based on this BMP. **Exhibit H-45** demonstrates this result using combined substantial and widespread screening variable data for Tier 3.

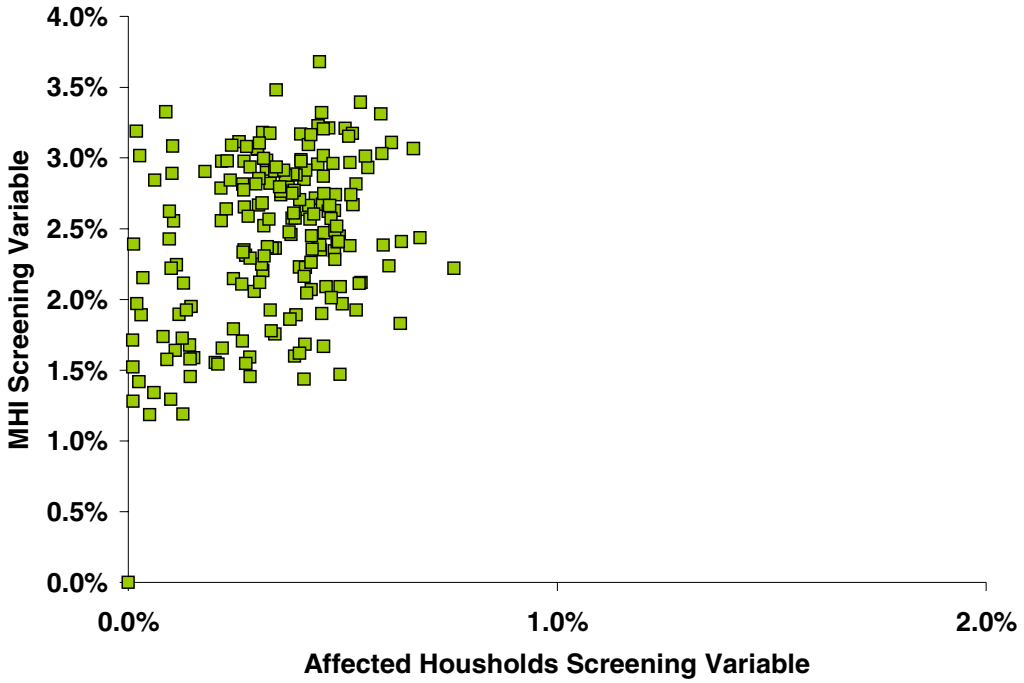


Exhibit H-45: Joint Screening Variable Values for Onsite Waste Management Systems

Exhibit H-46 contains a map showing the Tier 3 MHI screening variable values. Although the joint variable analysis shows that no jurisdiction is likely to have substantial and widespread impacts, this map is informative because it shows the distribution of household incomes throughout the watershed. That is, the BMP cost per household is the same in all areas, so the changes in the variable value reflect the level of MHI. Household incomes tend to be highest (greater than $57,000) in the counties surrounding Washington, D.C. Counties in the next ring (i.e., having variable values in the 2% to 3% range) have incomes ranging from $38,000 to $57,000. Washington, D.C., itself, is in this second income bracket. Incomes in the remainder of the watershed are generally below $38,000.

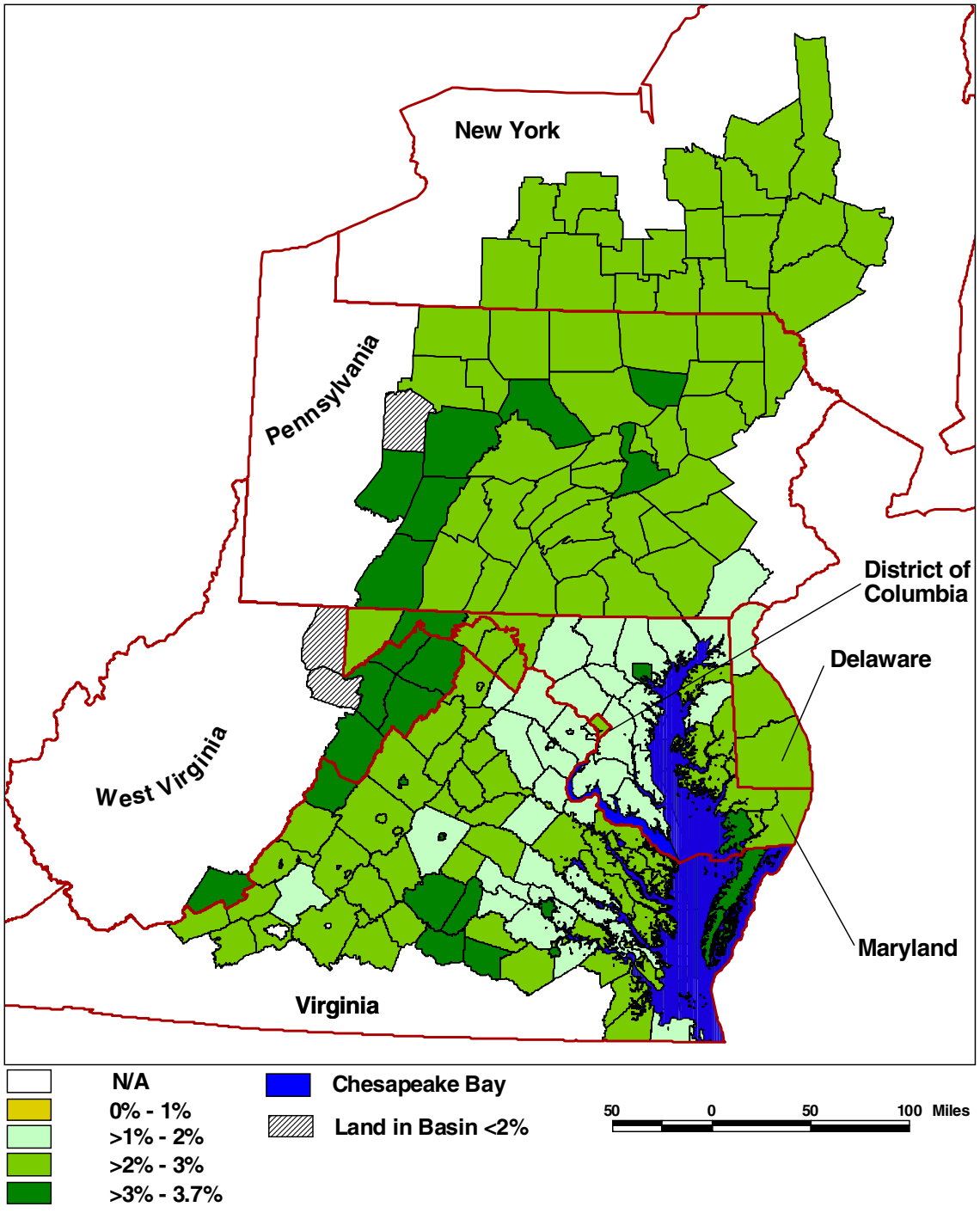


Exhibit H-46: Comparison of Onsite System Costs to Household Income: Tier 3 (Onsite System Screening Variable Values)

Sources of uncertainty for the MHI screening variable overlap with some sources of uncertainty for other screening variables. **Exhibit H-47** summarizes these factors.

Exhibit H-47: Sources of Uncertainty in the Screening Variables for Onsite Systems

Source	Direction of Bias	Comments
No real income growth through 2010.	+	Actual MPS values will be lower in areas for which real person income is forecast to grow by 2010, and lower in areas where real income is forecast to decline by 2010.
Constant unit BMP costs for all onsite systems.	?	Actual BMP costs will vary from site to site.

+ = assumption results in overestimating screening variable values
? = impact of assumption on screening variable values is unknown.

8.4 Groundtruthing of Screening Results

To further investigate how well the onsite system screening variables reflect the likelihood of substantial and widespread impacts, this section provides more comprehensive analysis of the results for Allegany County, MD. **Exhibit H-48** provides a summary of the estimated costs and screening variables for onsite systems across the modeling scenarios. Because so few existing systems will implement this control, substantial and widespread impacts are unlikely in Allegany County.

Exhibit H-48: Onsite System Screening Data for Allegany County, MD (2001$)

Estimate	Tier 1	Tier 2	Tier 3
Onsite System BMP Costs	0	0	80,507
Onsite system costs per household implementing onsite system BMPs as percent of county MHI	0.0%	0.0%	3.1%
Percent of households incurring onsite system BMP costs	0.0%	0.0%	0.3%

Source: Draft screening analysis output from November 19, 2002.

9. COMBINED SECTORS

Some households may experience impacts from controls on more than one sector. For instance, urban households may see increasing costs due to both urban area controls and POTW controls. Farm households may also experience impacts from both agricultural BMPs and onsite system BMPs. However, onsite system BMPs only occur in the Tier 3 scenario, and affect only 1% of all (farm and nonfarm) existing systems (representing failed systems and opportunities for upgrades). Therefore, the extent of this combination of controls is very limited (because it applies 1% of existing systems, which may be less than 1% of farm households in a jurisdiction because some nonfarm households will likely be affected).

Because the analysis of substantial and widespread impacts due to costs from more than one sector relates to costs passed through to households by public entities, the relevant EPA (1995) guidance is that related to preliminary and secondary tests for substantial impacts in the public sector, and consideration of changes in key socioeconomic variables for evaluating whether substantial impacts are also widespread. Section 3.1 summarizes EPA guidance for testing substantial and widespread impacts in the public sector.

9.1 Screening Variables

As a first step in narrowing down the data collection efforts for the analysis, a screening variable can be constructed that is based on the MPS at the county level:

- Average urban BMP costs plus average POTW costs (current residential sewer rate plus incremental annual costs per household) per urban household as a percent of MHI.

Estimated 2010 urban households reflect data from the 2000 Census and CBP population projections, as described in Section 5.2. Incremental POTW costs reflect costs to all the POTWs serving a county, divided by the total number of urban households. For urban households served by POTWs with no incremental costs under the tier scenarios (e.g., "insignificant" POTWs), total costs reflect current fees as estimated by the weighted average rate (weighted by the number of households served) for significant POTWs in the county. MHI is from the 2000 Census, adjusted to 2001 dollars using the CPI. Similar to the urban screening variable, this variable is not defined for counties that do not have an urban population.

Given the relatively greater data needs for evaluating potential for widespread impacts, there is no screening variable to identify areas that would not experience widespread impacts from costs in these sectors.

9.2 Screening Results

Exhibit H-49 provides a summary of the screening variable values by tier scenario. The variable values are below 1% for more than half of the counties in the watershed in all three tiers. In Tier

1, over 90% of counties have screening variable values of less than 1%, and all counties have values of less than 2%. In Tier 2, almost 70% of counties have values of less than 1% and 95% have values of less than 2%, while in Tier 3, almost 55% of counties have a screening variable value of less than 1% and 82% have a value of less than 2%.

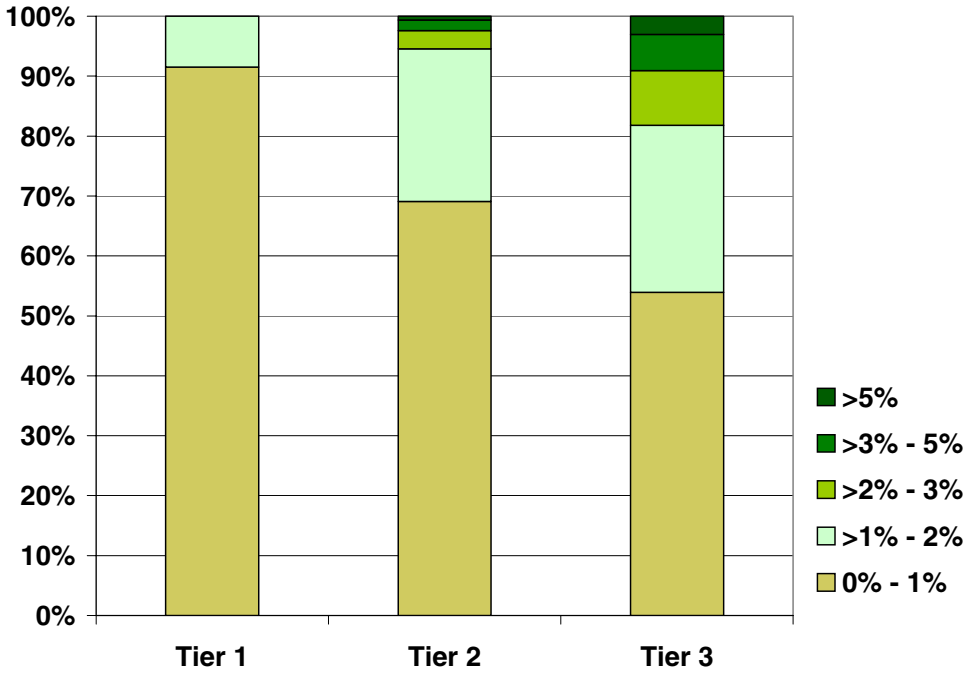


Exhibit H-49: Distribution of Urban Total Cost Screening Variable Values

Exhibits H-50 and **H-51** provide a geographic overview of the screening variable values for Tier 1 and Tier 3, respectively. Exhibit H-50 shows that most of the counties with Tier 1 variable values in the >1% - 2% range are along the lower Rappahannock in Virginia, and the eastern shore of Maryland, with a few in Pennsylvania and western Virginia. Several of the inland counties with higher values in Tier 1 are counties with low urban populations relative the BMP costs. Exhibit H-51 shows that most of the counties with high values in Tier 3 are in southern New York, northern and western Pennsylvania, and inland areas of Virginia and West Virginia. About two-thirds of the counties with variable values above 1% also have relatively small urban populations in the watershed. Counties that do not have urban populations appear white on the maps because the indicator is not applicable to those counties.

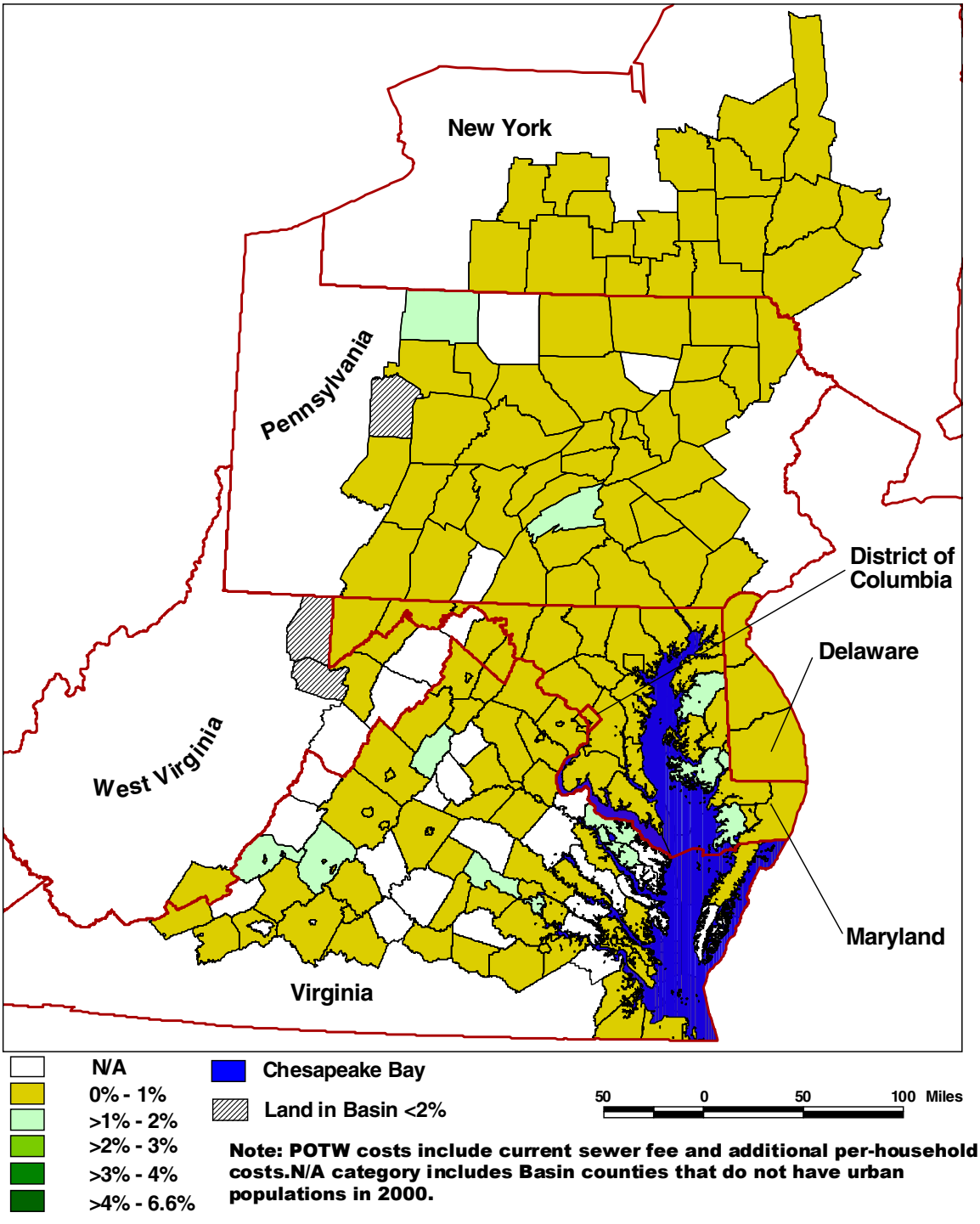


Exhibit H-50: Comparison of Total Household Sewer Costs Plus Average Household Urban BMP Costs to Median Household Income: Tier 1 (Combined POTW plus Urban BMP Screening Variable Values)

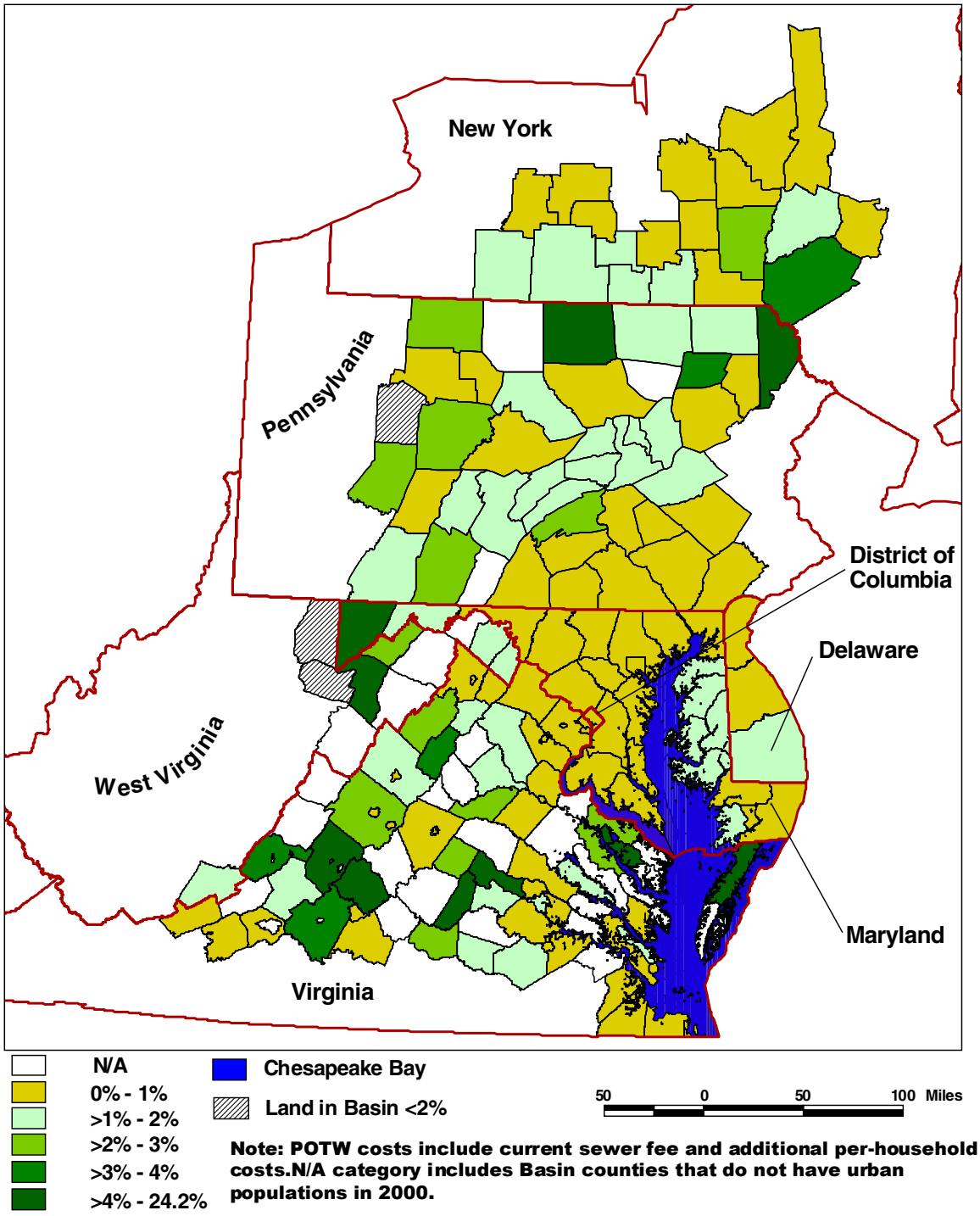


Exhibit H-51: Comparison of Total Household Sewer Costs Plus Average Household Urban BMP Costs to Median Household Income: Tier 3 (Combined POTW plus Urban BMP Screening Variable Values)

Because this screening variable includes information from both the urban sector and POTWs, sources of uncertainty that relate to those sectors also affect this variable. **Exhibit H-52** provides a summary of those sources of uncertainty, which are discussed in greater detail in Sections 3.3 (POTWs) and 7.3 (Urban Sources).

Exhibit H-52: Sources of Uncertainty in the Total Urban Screening Variable

Source	Direction of Bias	Comments
Residential customers bear 100% of additional costs for most POTWs.	+	Actual MPS values will be lower after accounting for costs borne by industrial and commercial users.
No real income growth through 2010.	+	Actual MPS values will be lower in areas for which real person income is forecast to grow by 2010, and lower in areas where real income is forecast to decline by 2010.
Number of households served is calculated based on flow for 45 POTWs where other data are unavailable.	?	MPS screening values may or may not reflect actual MPS values.
Current annual residential sewer rate placeholder of $200 for 143 POTWs where other data are unavailable.	?	MPS screening values may or may not reflect actual MPS values.
Proportion of urban population in watershed equals proportion of total population in watershed.	?	Actual MPS values will be lower in areas where urban population is concentrated within the watershed, and higher in areas where urban population is concentrated outside the watershed.
Urban population growth equals overall county population growth.	?	Actual MPS values will be lower in urban areas that grow faster than the remainder of the county and actual MPS values will be higher in urban areas that grow less fast than the remainder of the county.
Urban MHI is assumed equal to overall MHI.	?	MPS screening values may or may not reflect actual MPS values.
Constant unit BMP costs applied to all BMP acres in the Basin.	?	Actual BMP costs will vary from site to site.

+ = assumption results in overestimating screening variable value
? = impact of assumption on screening variable values is unknown

7.3 Groundtruthing of Screening Results

To investigate how well the MPS-based screening variable for the urban combined sectors reflects actual MPS value, this section provides more comprehensive analysis of the results for Allegany County, MD. **Exhibit H-53** provides a summary of the estimated costs and MPS screening variable across the tier scenarios. Costs for controls in urban areas range from $0.3 million under Tier 1 to $2.6 million under Tier 3, with the higher Tier 3 costs reflecting the more

costly retrofitting of urban areas with storm water controls. The screening variable value incorporates an estimate of 19,386 urban households in Allegany County in 2010. When combined with POTW rate increases, household costs for BMPs on urban and mixed open land represent 0.8% to 1.2% of MHI.

Exhibit H-53: Combined Urban Screening Data for Allegany County, MD (2001$)

Estimate	Tier 1	Tier 2	Tier 3
Urban & Mixed Open BMP Costs	334,503	854,364	2,572,116
POTW Costs Borne by Households (50% of capital costs plus O&M costs)	399,844	496,360	1,020,600
POTW Costs Borne by State (50% of capital costs)	242,874	251,790	523,825
Combined (POTW plus urban area control) Costs as Percent of County MHI	0.8%	0.9%	1.2%

Source: Draft screening analysis output from November 19, 2002.

EPA (1995) guidance indicates that a secondary test should be employed to further characterize the financial health of a community that has an MPS value over 1%. However, before drawing any conclusions regarding the potential for impacts of an MPS value of 1.2%, the accuracy of the POTW or urban BMP costs needs to be evaluated. Data from the 2000 Census indicate that the largest city in Allegany County (Cumberland, with a population of 21,518) has a density of 3.7 people per acre; the highest density is found in Lonaconing, with 4.5 people per acre, but only 1,205 people. (For comparison, the District of Columbia has 15 people per acre; Baltimore has 13). With lower population densities, urban retrofits may be less costly than the unit BMP costs (i.e., towards the lower end of case study cost ranges, instead of the mean values used in the screening analysis). In addition, Federal or State cost-share funds have not been included as offsets to urban BMP costs. Thus, actual costs may be lower than indicated. If that is the case, then it is unlikely that urban households will experience substantial impacts from potential combined costs under any of the tier scenarios in Allegany county.

8. SUMMARY

This section provides a summary of the screening analysis results. Consistent with the purpose of the screening analysis, the results indicate the jurisdictions (i.e., counties and independent cities) that are unlikely to meet the criteria in EPA guidance (1995) for having substantial *and* widespread impacts based on the values calculated for the screening variables. The situation for the remaining jurisdictions is uncertain—they may or may not incur substantial and widespread social and economic impacts. Only a substantial and widespread analysis can provide the information necessary to make this determination. However, as discussed above, given the size of the regional economy ($1.4 trillion in personal income in the 6-State and D.C. area, with $573 billion in Bay counties), widespread impacts over this area are unlikely; regional modeling for Maryland indicated that the Tier 3 scenario would result in a net increase in output and employment over baseline forecast levels.

Exhibit H-54 provides a summary for Tier 1. Tier 1 generally represents baseline conditions that are expected to prevail regardless of any additional nutrient reduction programs or actions. Tier 1 may not, however, fully reflect baseline controls associated with the final CAFO rule, CZARA, and long-term CSO controls.

Exhibit H-54: Summary of Screening Analysis Results for Tier 1

Sector	Screening Analysis Results
POTW	95% of jurisdictions have MHI variable < 1%
Urban	99% of jurisdictions have MHI variable < 1%
Urban Combined	92% of jurisdictions have MHI variable < 1%
Industrial	n/a
Agriculture[1]	92% of jurisdictions have MHI variable < 1% or earnings variable < 5%
Forestry	100% of jurisdictions have earnings from forestry of < 3%
Onsite Waste Management	n/a

n/a = screening analysis not applicable for this scenario

1. The estimate increases to 97% if the earnings variable based solely on farm earnings is used.

As the summary shows, almost all jurisdictions incurring POTW or urban costs are unlikely to meet EPA criteria for substantial and widespread impacts because they have screening variable values less than 1%. Similarly, the analysis of joint POTW and urban costs indicates that 92% of jurisdictions are unlikely to meet criteria for substantial and widespread impacts. The remaining jurisdictions that have screening variable values greater than 1% require a substantial and widespread impact analysis to determine whether they meet the criteria specified in EPA guidance. Not included in this analysis are baseline household costs that may result from CSO controls. The timing and funding (e.g., cost share grants) for such programs are site-specific and not certain. Appendix I provides sensitivity analyses for three jurisdictions and additional information about CSO plans in the Basin.

No jurisdictions are expected to meet EPA criteria for substantial and widespread impacts as a result of forestry BMPs because forestry represents a small share (less than 3%) of earnings in all jurisdictions. The small values indicate that the sector is small relative to the county economy and, therefore, a sector-level substantial impact (if any) is unlikely to have widespread ramifications.

Finally, 92% of jurisdictions are not likely to meet EPA criteria for substantial and widespread impacts as a result of agricultural BMPs because household-level impacts are small (BMP costs represent less than 1% of MHI) or agriculture represents a small share of earnings in the jurisdictions (less than 5%). The joint screening test is consistent with the need to meet both the substantial and widespread criteria established by EPA. This result uses the earnings screening variable for farm income and related sectors. When only farm income is considered, 97% of jurisdictions are not likely to meet EPA criteria for substantial and widespread impacts.

Under Tier 2 (**Exhibit H-55**), the urban sector is the least affected with 95% of jurisdictions not likely to meet EPA criteria for substantial and widespread impacts BMP costs represent a small share of household income (e.g., less than1%). POTW control costs in 85% of jurisdictions are not likely to meet EPA impact criteria based on low MHI variable values. Finally, MHI variable values for combined POTW and urban costs are below 1% in 69% of jurisdictions, indicating a low probability of meeting EPA impact criteria in these locations. Most of the remaining jurisdictions have screening variable values in the 1% to 2% range and, therefore, may also have low potential for substantial and widespread impacts. An analysis of substantial and widespread impacts could be performed to verify this result.

Exhibit H-55: Summary of Screening Analysis Results for Tier 2

Sector	Screening Analysis Results
POTW	85% of jurisdictions have MHI variable < 1%
Urban	95% of jurisdictions have MHI variable < 1%
Urban Combined	69% of jurisdictions have MHI variable < 1%
Industrial[1]	93% of jurisdictions have earnings variable < 5%
Agriculture[2]	89% of jurisdictions have MHI variable < 1% or earnings variable < 5%
Forestry	100% of jurisdictions have earnings from forestry of < 3%
Onsite Waste Management	n/a

n/a = screening analysis not applicable for this scenario
1. Excludes 10 counties with missing earnings data for one or more sectors that include a substantial discharger.
2. The estimate increases to 97% if the earnings variable based solely on farm earnings is used.

The forest sector analysis is unchanged because the screening variable does not depend on tier scenario costs. The agricultural sector analysis shows that 89% of jurisdictions are unlikely to meet both the substantial and widespread impact criteria. This result is based on the more conservative earnings variable, which includes agricultural services and manufacturing industrial categories. The percentage increases to 97% if the earnings variable is based solely on farm earnings.

The Tier 2 screening analysis for industrial point sources shows that most of jurisdictions having complete data are not likely to meet EPA impact criteria because earnings from the sector represent less than 5% of all earnings. In fact, 93% of all jurisdictions have earnings variable values less than 1%. The screening variable for 10 jurisdictions cannot be evaluated because of missing BEA data. An analysis of substantial and widespread impacts can be performed for these jurisdictions as well as for those with the larger shares of earnings from the sector (e.g., > 5%).

Under the Tier 3 scenario (**Exhibit H-56**), 54% of jurisdictions are not likely to meet EPA impact criteria because they have MHI variable values less than 1% for combined urban and

POTW costs. The effect of combined costs on the remaining 46% is uncertain and, therefore, must be analyzed using the tests for substantial and widespread impacts in EPA guidance (1995).

Tier 3 results for agriculture in Exhibit H-56 are nearly identical to Tier 2 results despite BMP cost increases. This happens because the earnings variable is constant across the tier scenarios and it becomes the binding constraint on the need to show that there is may be potential to meet both criteria.

Exhibit H-56: Summary of Screening Analysis Results for Tier 3

Sector	Screening Analysis Results
POTW	80% of jurisdictions have MHI variable < 1%
Urban	79% of jurisdictions have MHI variable < 1%
Urban/POTW Combined	54% of jurisdictions have MHI variable < 1%
Industrial[1]	93% of jurisdictions have earnings variable < 5%
Agriculture[2]	88% of jurisdictions have MHI variable < 1% or earnings variable < 5%
Forestry	No jurisdictions have earnings from forestry of >3%
Onsite Waste Management	Only 1% of existing systems (fewer than 1% of total households) affected

1. Excludes 10 counties with missing earnings data for one or more sectors that include a substantial discharger.
2. The estimate increases to 97% if the earnings variable based solely on farm earnings is used.

One additional sector incurs costs under Tier 3—the household onsite waste management BMP. The screening analysis indicates that no jurisdictions are likely to meet EPA criteria for substantial and widespread impacts because of the onsite waste management BMP because, since so few households (less than 1% of existing onsite systems) are affected by this control, any substantial financial impacts are not likely to have a widespread impact on the community.

Groundtruthing of the screening variable values for Allegany County, Maryland provides insights into the validity of the screening analysis variables. For example, better POTW sewer rate and residential service data generate slightly lower MPS values, which do not contradict the outcome of the screening analysis. This confirms that the conservative design of the screening analysis prevents false conclusions of a county having little or no potential meet EPA impact criteria.

The comprehensive analysis of the agricultural sector indicates that the agricultural variables most likely overstate the potential for meeting EPA impact criteria. In particular, the livestock cost screening variable generates uncertain results that, on closer inspection, are not indicative of a high likelihood for impacts. Instead, the results indicate that the conservative design of the screening analysis has a tendency to generate uncertain results in instances where the EPA impact criteria are not likely to be met. The BMP costs in the livestock screening variable may not reflect cost-effective control measures given the level of intensity of animal agriculture in the

county and, thus, the result may reflect an upward bias in the BMP costs rather than a potential for impact.

The macro economic model results provide an important perspective that is missing from the screening model—one sector's cost is another sector's revenue. Thus, the net economic impact of a tier scenario depends ultimately on complex industrial and market relationships that cannot be evaluated without a macro economic model. Results from model simulation for Maryland demonstrate that the net economic impact is positive. In particular, model results indicate a net increase in overall economic output and employment because costs in each sector are offset by revenues they generate in other sectors. This happens because the expenditures occur in sectors with higher regional output and employment multipliers, and some of the expenditures represent an influx of Federal funds to the region. These two factors – coupled with the effect that annual compliance costs are small compared to the regional economy – negate any potential for adverse widespread impacts at the watershed level. It is possible that the same factors will limit potential for widespread impacts at the county level as well. These regional modeling results do not include the market benefits (e.g., to commercial and recreational fishing industries) in coastal counties, that may result from improved water quality.

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Attachment 1: Calculation of Screening Variables

This Attachment provides the detailed formulas for each screening variable, an explanation of the method used for calculating agricultural screening variables for counties partially in the watershed, and the method for projecting economic variables in the year 2010.

H1.1 Formulas for Screening Variables

In the formulas below, a subscript of "i" denotes individual BMPs (e.g., riparian forest buffers); "c" denotes county.

1. Incremental annual control costs per household in the service population plus existing residential control costs (i.e., sewer rate) as a percent of median household income:

$$\text{POTW MPS}_c = \frac{\text{sewer rate}_{p \in c} + \text{cost}_{p \in c}}{\text{MHI}_c}$$

where p = significant POTW
p 0 c = the set of POTWs incurring costs in county c
MHI_c = median household income in county c

$$\text{sewer rate}_{p \in c} = \frac{\sum_{p \in c} \text{current household fees}_p \times \text{HH}_p}{\sum_{p \in c} \text{residential service population}_p}$$

$$\text{cost}_{p \in c} = \frac{\sum_{p \in c} \text{control cost}_p}{\sum_{p \in c} \text{service populations}_p}$$

2. Earnings from industrial sectors that contain significant dischargers in the county as a percent of all earnings in the county:

$$\text{Earnings share}_c = \frac{\sum_{j \in J_c} \text{earnings}_{j,c}}{\text{total earnings}_c}$$

where j = industry category corresponding to two-digit SIC level
J_c = the set of industries in county c that contain at least one discharger incurring costs.

3. Earnings from forestry plus estimated earnings from the logging sector in the county as a percent of all earnings in the county:

$$\text{Earnings share}_c = \frac{\text{earnings}_{\text{forestry},c} + 0.1079 \times \text{earnings}_{\text{lumber \& wood products},c}}{\text{total earnings}_c}$$

4. Agricultural BMP costs as a percent of net cash return (NCR) from agricultural sales plus government payments:

$$\text{NCR screening variable}_c = \frac{\text{livestock costs}_c + \text{crop costs}_c}{\text{NCR}_c + \text{Gov}_c}$$

where Gov_c = government payments to county c, except Commodity Credit Corporation loans, which are already in NCR_c
livestock $costs_c$ and crop $costs_c$ are defined below (see 7 and 6, respectively).

5. Mean per-farm BMP costs as a percent of median household income (MHI) at the county level:

$$\text{MHI screening variable}_c = \frac{(\text{livestock costs}_c + \text{crop costs}_c)/\text{farms}_c}{\text{MHI}_c}$$

where $farms_c$ = the number of farms in county c

6. Crop BMP costs (including a portion of hay crop BMP costs) as a percent of crop and hay sales:

$$\text{crop}_c = \frac{\text{crop costs}_c}{\text{market value of crop sales}_c}$$

where

$$\text{crop costs}_c = \sum_i (\text{acres}_{HT,i,c} \times \text{cost}_{HT,i}) + \sum_i (\text{acres}_{LT,i,c} \times \text{cost}_{LT,i}) + S_c \times \sum_i (\text{acres}_{\text{hay},i,c} \times \text{cost}_{\text{hay},i})$$

HT = high till
LT = low till
i = a subscript denoting BMP i.

The term S_c indicates that a county-specific share variable (between 0% and 100%) of the BMP costs on hay acreage is included in the crop sales screening variable. The share is calculated as:

$$S_c = \frac{\text{market value of crop and hay sales}_c}{\text{market value of total agricultural sales}_c}.$$

7. Livestock BMP costs (plus a portion of hay crop BMP costs) as a percent of livestock and livestock products sales:

$$\text{livestock}_c = \frac{\text{livestock costs}_c}{\text{market value of livestock sales}_c}$$

where

$$\text{livestock costs}_c = \sum_i (\text{acres}_{P,i,c} \times \text{cost}_{P,i}) + (\sum_i \text{acres}_{MA,i,c} \times \text{cost}_{MA,i}) + (1 - S_c) \times \sum_i (\text{acres}_{hay,i,c} \times \text{cost}_{hay,i})$$

P = pasture
MA = manure acres
i = is a subscript denoting BMP i.

8. Earnings from agriculture and related sectors in the county as a percent of all earnings in the county:

$$\text{Earnings share}_c = \frac{\text{earnings}_{\text{agriculture},c} + \text{earnings}_{\text{ag svcs},c} + \text{earnings}_{\text{food \& kindred},c} + \text{earnings}_{\text{tobacco},c}}{\text{total earnings}_c}$$

9. Urban BMP costs per urban household as a percent of median household income:

$$\text{Urban screening variable}_c = \frac{\text{BMP costs}_c / \text{HH}_{u,c}}{\text{MHI}_c}$$

where

$$\text{BMP costs}_c = \sum_i \text{acres}_{UP,i,c} \times \text{cost}_{UP,i} + \sum_i \text{acres}_{UI,i,c} \times \text{cost}_{UI,i} + \sum_i \text{acres}_{UU,i,c} \times \text{cost}_{UU,i} + \sum_i \text{acres}_{MO,i,c} \times \text{cost}_{MO,i}$$

UP = urban pervious land use
UI = urban impervious land use
UU = ultra-urban land use
MO = mixed open land use

$HH_{u,c}$ = number of urban households in county c
i = is a subscript denoting BMP i.

10. Average onsite system BMP costs per household implementing onsite system BMPs as a percent of median household income:

$$\text{Onsite Substantial Screening Variable}_c = \frac{\text{cost}_{\text{denit + pump}}}{\text{MHI}_c}$$

11. Number of households implementing onsite system BMPs on existing systems as a percent of households within the watershed in 2010:

$$\text{Onsite Widespread Screening Variable}_c = \frac{HH_{ss,c}}{HH_c}$$

where $HH_{ss,c}$ = households in county c implementing BMPs on existing onsite systems
HH_c = total households in the Bay watershed portion of county c.

12. Total urban BMP costs per urban household plus total per-household POTW costs as a percent of median household income:

$$\text{Total Urban Screening Variable}_c = \frac{(\text{BMP costs}_c + \sum_{p \in c} \text{POTW}_p)/HH_{u,c}}{\text{MHI}_c}$$

where $POTW_p$ = incremental control costs and current sewer fees for all households served.

H1.2 Supplemental Data Calculations

Agricultural Data for Counties Partially within the Watershed

For counties partially within the Bay watershed, sales and net cash return data in the formulas above is adjusted to reflect the portion of income earned by farms in the watershed based on the proportion of agricultural land in the watershed as of 2000. The calculation of agricultural land for the entire county is as follows:

- calculate total farm land (tilled land, hay and pasture) for 1992 and 1997 from Census of Agriculture data, as the sum of “Total cropland,” “Woodland pasture,” and “Pastureland and rangeland other than cropland and woodland pasture”
- extrapolate total farmland to 2000 based on the linear relationship between 1992 and 1997 farmland (i.e., if there are 5,000 acres in 1992 and 4,000 acres in 1997, then the

2000 estimate would be 3,400 acres, on the assumption that farmland continues to decline by 200 acres per year).

The number of acres of farmland within the watershed in 2000 is divided by the estimated number of acres of farmland within the county in 2000. This ratio represents the portion of farmland in each county that lies within the Bay watershed, and is used to apportion market value of agricultural products sold, government payments, and net cash return to the parts of counties within the watershed. This method implies that sales and net cash return are uniformly distributed across farmland.

For seven counties, the Census of Agriculture did not release data on farmland for either 1992, 1997, or both. For these counties, the adjustment uses the proportion of total land within the watershed (i.e., Bay Program estimates of total land in the county within the watershed divided by total county land area from the 2000 Census). In all 7 counties, the proportion of land within the watershed is 97% or greater.

Calculating 2010 Demographic Data

2010 Number of households in basin – by county

$$HH_c = HH_{2000,c} \times \frac{Population_{basin,2000,c}}{Population_{2000,c}} \times \frac{Population_{basin,2010,c}}{Population_{basin,2000,c}}$$

where $HH_{2000,c}$ = total county households in 2000
$Population_{2000,c}$ = total county population in 2000
$Population_{basin,year,c}$ = total population in Bay watershed portion of county in 2000 or 2010.

2010 Number of urban households - by county

$$HH_{u,c} = HH_{basin,urban,2000,c} \times \frac{Population_{basin,2010,c}}{Population_{basin,2000,c}}$$

where $HH_{basin,urban,2000,c}$ = number of households in Bay watershed portion of county c that are located in urbanized areas or urban clusters.

Attachment 2: Screening Data and Variable Values

Exhibit H2-1. POTW MPS Screening Data and Variable Values

County	Number of Significant POTWs in 2010	Estimated Households Served in 2010	County MHI from 2000 Census	Estimated Annual Costs (Tier 1)	Estimated Annual Costs (Tier 2)	Estimated Annual Costs (Tier 3)	Estimated Grant Funding (% of Capital Costs)	Estimated Facility-weighted Current Sewer Rate	Estimated County MPS Screening Variable (Tier 1)	Estimated County MPS Screening Variable (Tier 2)	Estimated County MPS Screening Variable (Tier 3)
Kent, DE	0	0	43,531	0	0	0	0%	0	0.0%	0.0%	0.0%
New Castle, DE	0	0	55,723	0	0	0	0%	0	0.0%	0.0%	0.0%
Sussex, DE	3	4,903	41,679	239,875	552,811	785,664	0%	345	0.9%	1.1%	1.2%
Washington, DC	1	250,451	42,656	0	5,809,313	18,779,834	0%	196	0.5%	0.5%	0.6%
Allegany, MD	3	11,780	32,764	399,844	496,360	1,020,600	50%	222	0.8%	0.8%	0.9%
Anne Arundel, MD	8	153,321	65,661	789,788	817,960	3,089,783	50%	169	0.3%	0.3%	0.3%
Baltimore, MD	1	523,012	53,860	0	764,564	6,333,537	50%	169	0.3%	0.3%	0.3%
Calvert, MD	1	629	70,101	0	0	109,522	50%	240	0.3%	0.3%	0.5%
Caroline, MD	2	2,035	41,279	122,797	124,065	261,950	50%	200	0.6%	0.6%	0.7%
Carroll, MD	4	12,761	63,804	0	5,741	667,675	50%	200	0.3%	0.3%	0.4%
Cecil, MD	3	8,538	53,693	672,660	673,911	1,073,876	50%	240	0.5%	0.5%	0.6%
Charles, MD	3	9,168	66,119	1,050,062	1,067,838	1,753,262	50%	200	0.4%	0.4%	0.5%
Dorchester, MD	2	6,281	36,225	1,245,148	1,408,516	1,897,437	50%	200	0.9%	1.0%	1.1%
Frederick, MD	6	82,764	64,075	1,019,398	1,275,927	2,341,514	50%	115	0.2%	0.2%	0.2%
Garrett, MD	0	0	34,270	0	0	0	50%	0	0.0%	0.0%	0.0%
Harford, MD	6	31,581	60,841	1,174,674	1,192,336	2,674,777	50%	127	0.2%	0.2%	0.3%
Howard, MD	1	70,881	78,841	0	0	888,940	50%	98	0.1%	0.1%	0.1%
Kent, MD	1	1,580	42,382	213,875	244,311	330,526	50%	108	0.5%	0.5%	0.6%
Montgomery, MD	4	278,238	76,061	2,542,911	5,046,387	11,606,719	50%	183	0.2%	0.3%	0.3%
Prince Georges, MD	5	254,849	58,739	0	2,456,778	9,906,466	50%	190	0.3%	0.3%	0.4%
Queen Annes, MD	2	8,074	60,632	2,126,010	2,139,550	2,331,788	50%	375	0.9%	0.9%	0.9%
St Marys, MD	2	8,637	58,154	151,779	181,929	533,406	50%	200	0.4%	0.4%	0.4%
Somerset, MD	2	4,314	31,788	625,613	644,522	839,218	50%	234	1.0%	1.0%	1.1%
Talbot, MD	1	4,457	46,276	0	40,271	202,564	50%	200	0.4%	0.4%	0.5%
Washington, MD	5	22,396	43,177	527,616	644,762	1,436,218	50%	200	0.5%	0.5%	0.6%
Wicomico, MD	3	10,517	41,495	1,833,771	1,870,730	2,341,459	50%	200	0.7%	0.8%	0.8%
Worcester, MD	2	4,160	43,212	500,094	559,559	735,686	50%	200	0.7%	0.7%	0.8%
Baltimore City, MD	1	48,591	31,974	16,536,207	16,536,207	19,527,569	50%	200	1.3%	1.3%	1.4%
Allegany, NY	0	0	34,129	0	0	0	0%	0	0.0%	0.0%	0.0%
Broome, NY	2	130,673	37,575	0	914,926	1,892,117	0%	200	0.5%	0.6%	0.6%
Chemung, NY	2	27,613	38,710	0	1,758,484	2,696,204	0%	200	0.5%	0.7%	0.8%
Chenango, NY	1	3,617	35,802	0	347,369	530,812	0%	200	0.6%	0.8%	1.0%

Exhibit H2-1. POTW MPS Screening Data and Variable Values

County	Number of Significant POTWs in 2010	Estimated Households Served in 2010	County MHI from 2000 Census	Estimated Annual Costs (Tier 1)	Estimated Annual Costs (Tier 2)	Estimated Annual Costs (Tier 3)	Estimated Grant Funding (% of Capital Costs)	Estimated Facility-weighted Current Sewer Rate	Estimated County MPS Screening Variable (Tier 1)	Estimated County MPS Screening Variable (Tier 2)	Estimated County MPS Screening Variable (Tier 3)
Cortland, NY	1	12,777	36,530	0	21,404	500,802	0%	200	0.5%	0.6%	0.7%
Delaware, NY	1	2,095	34,507	0	323,532	441,038	0%	200	0.6%	1.0%	1.2%
Herkimer, NY	0	0	34,999	0	0	0	0%	0	0.0%	0.0%	0.0%
Livingston, NY	0	0	44,717	0	0	0	0%	0	0.0%	0.0%	0.0%
Madison, NY	1	1,476	42,717	0	238,365	316,266	0%	200	0.5%	0.8%	1.0%
Oneida, NY	0	0	38,172	0	0	0	0%	0	0.0%	0.0%	0.0%
Onondaga, NY	0	0	43,421	0	0	0	0%	0	0.0%	0.0%	0.0%
Ontario, NY	0	0	47,389	0	0	0	0%	0	0.0%	0.0%	0.0%
Otsego, NY	3	9,524	35,552	0	860,370	1,209,248	0%	200	0.6%	0.8%	0.9%
Schoharie, NY	0	0	38,891	0	0	0	0%	0	0.0%	0.0%	0.0%
Schuyler, NY	0	0	38,280	0	0	0	0%	0	0.0%	0.0%	0.0%
Steuben, NY	4	14,250	37,715	0	1,254,698	1,766,796	0%	200	0.5%	0.8%	0.9%
Tioga, NY	3	5,909	42,804	0	516,494	830,874	0%	200	0.5%	0.7%	0.8%
Tompkins, NY	0	0	39,621	0	0	0	0%	0	0.0%	0.0%	0.0%
Yates, NY	0	0	36,823	0	0	0	0%	0	0.0%	0.0%	0.0%
Adams, PA	4	12,608	45,395	0	236,464	1,070,256	0%	206	0.5%	0.5%	0.6%
Bedford, PA	2	1,924	34,794	0	421,518	562,481	0%	200	0.6%	1.2%	1.4%
Berks, PA	0	0	47,532	0	0	0	0%	0	0.0%	0.0%	0.0%
Blair, PA	8	36,394	34,932	206,110	1,549,947	4,298,017	0%	209	0.6%	0.7%	0.9%
Bradford, PA	2	5,191	37,246	0	303,723	517,385	0%	301	0.8%	1.0%	1.1%
Cambria, PA	0	0	32,081	0	0	0	0%	0	0.0%	0.0%	0.0%
Cameron, PA	0	0	34,242	0	0	0	0%	0	0.0%	0.0%	0.0%
Centre, PA	4	20,647	38,444	57,021	885,818	1,309,221	0%	227	0.6%	0.7%	0.8%
Chester, PA	0	0	69,410	0	0	0	0%	0	0.0%	0.0%	0.0%
Clearfield, PA	3	6,164	33,333	0	632,892	944,701	0%	144	0.4%	0.7%	0.9%
Clinton, PA	3	11,025	33,022	388,031	680,761	1,253,070	0%	200	0.7%	0.8%	0.9%
Columbia, PA	2	13,882	36,243	0	866,961	1,271,978	0%	200	0.6%	0.7%	0.8%
Cumberland, PA	11	39,414	49,651	0	2,955,999	4,478,883	0%	211	0.4%	0.6%	0.7%
Dauphin, PA	10	45,710	44,123	2,481,261	4,589,240	6,010,735	0%	216	0.6%	0.7%	0.8%
Elk, PA	0	0	39,917	0	0	0	0%	0	0.0%	0.0%	0.0%
Franklin, PA	6	38,230	43,027	535,409	1,521,464	2,121,682	0%	217	0.5%	0.6%	0.6%
Fulton, PA	0	0	37,080	0	0	0	0%	0	0.0%	0.0%	0.0%
Huntingdon, PA	2	5,751	35,413	0	601,502	861,702	0%	200	0.6%	0.9%	1.0%

Exhibit H2-1. POTW MPS Screening Data and Variable Values

County	Number of Significant POTWs in 2010	Estimated Households Served in 2010	County MHI from 2000 Census	Estimated Annual Costs (Tier 1)	Estimated Annual Costs (Tier 2)	Estimated Annual Costs (Tier 3)	Estimated Grant Funding (% of Capital Costs)	Estimated Facility-weighted Current Sewer Rate	Estimated County MPS Screening Variable (Tier 1)	Estimated County MPS Screening Variable (Tier 2)	Estimated County MPS Screening Variable (Tier 3)
Indiana, PA	0	0	32,138	0	0	0	0%	0	0.0%	0.0%	0.0%
Jefferson, PA	0	0	33,721	0	0	0	0%	0	0.0%	0.0%	0.0%
Juniata, PA	1	633	36,885	0	206,903	266,393	0%	220	0.6%	1.5%	1.7%
Lackawanna, PA	6	63,902	36,608	216,287	1,945,315	4,155,506	0%	148	0.4%	0.5%	0.6%
Lancaster, PA	11	59,081	48,375	791,726	3,011,768	7,206,603	0%	199	0.4%	0.5%	0.7%
Lebanon, PA	3	21,015	43,412	0	866,565	1,742,160	0%	184	0.4%	0.5%	0.6%
Luzerne, PA	5	198,054	35,899	0	1,342,221	5,450,431	0%	125	0.3%	0.4%	0.4%
Lycoming, PA	5	18,125	36,160	991,886	1,986,845	3,938,037	0%	137	0.5%	0.7%	1.0%
Mckean, PA	0	0	35,122	0	0	0	0%	0	0.0%	0.0%	0.0%
Mifflin, PA	3	6,412	34,203	0	733,699	1,029,206	0%	273	0.8%	1.1%	1.3%
Montour, PA	1	4,794	40,475	0	362,729	551,052	0%	200	0.5%	0.7%	0.8%
Northumberland, PA	5	27,155	33,288	255,485	1,721,764	2,615,667	0%	195	0.6%	0.8%	0.9%
Perry, PA	1	2,902	44,550	0	200,894	278,488	0%	600	1.3%	1.5%	1.6%
Potter, PA	0	0	34,286	0	0	0	0%	0	0.0%	0.0%	0.0%
Schuylkill, PA	5	10,652	34,760	0	808,228	1,282,816	0%	217	0.6%	0.8%	1.0%
Snyder, PA	1	4,390	38,249	254,297	309,203	317,866	0%	200	0.7%	0.7%	0.7%
Somerset, PA	0	0	32,859	0	0	0	0%	0	0.0%	0.0%	0.0%
Sullivan, PA	0	0	32,187	0	0	0	0%	0	0.0%	0.0%	0.0%
Susquehanna, PA	1	1,249	35,741	0	200,054	251,434	0%	184	0.5%	1.0%	1.1%
Tioga, PA	4	5,032	34,038	0	949,203	1,292,685	0%	200	0.6%	1.1%	1.3%
Union, PA	5	6,305	42,878	312,631	525,261	1,177,908	0%	272	0.7%	0.8%	1.1%
Wayne, PA	0	0	36,230	0	0	0	0%	0	0.0%	0.0%	0.0%
Wyoming, PA	0	0	38,657	0	0	0	0%	0	0.0%	0.0%	0.0%
York, PA	9	100,003	48,121	0	1,597,318	4,008,532	0%	201	0.4%	0.4%	0.5%
Accomack, VA	2	1,111	32,157	0	424,272	484,854	10%	268	0.8%	1.9%	2.1%
Albemarle, VA	1	10,860	53,947	0	1,275,847	1,999,089	10%	138	0.3%	0.5%	0.6%
Alleghany, VA	1	4,668	40,974	0	362,014	490,917	10%	402	1.0%	1.2%	1.2%
Amelia, VA	0	0	42,789	0	0	0	10%	0	0.0%	0.0%	0.0%
Amherst, VA	1	15,537	39,750	0	4,901,997	6,057,645	10%	289	0.7%	1.5%	1.6%
Appomattox, VA	0	0	38,808	0	0	0	10%	0	0.0%	0.0%	0.0%
Arlington City, VA	1	32,771	66,972	0	0	1,678,235	10%	151	0.2%	0.2%	0.3%
Augusta, VA	4	14,656	45,758	0	756,722	1,229,063	10%	183	0.4%	0.5%	0.6%
Bath, VA	0	0	37,220	0	0	0	10%	0	0.0%	0.0%	0.0%

Exhibit H2-1. POTW MPS Screening Data and Variable Values

County	Number of Significant POTWs in 2010	Estimated Households Served in 2010	County MHI from 2000 Census	Estimated Annual Costs (Tier 1)	Estimated Annual Costs (Tier 2)	Estimated Annual Costs (Tier 3)	Estimated Grant Funding (% of Capital Costs)	Estimated Facility-weighted Current Sewer Rate	Estimated County MPS Screening Variable (Tier 1)	Estimated County MPS Screening Variable (Tier 2)	Estimated County MPS Screening Variable (Tier 3)
Bedford, VA	0	0	45,855	0	0	0	10%	0	0.0%	0.0%	0.0%
Botetourt, VA	0	0	51,802	0	0	0	10%	0	0.0%	0.0%	0.0%
Buckingham, VA	0	0	31,765	0	0	0	10%	0	0.0%	0.0%	0.0%
Campbell, VA	0	0	39,630	0	0	0	10%	0	0.0%	0.0%	0.0%
Caroline, VA	3	7,014	42,356	249,327	503,410	719,982	10%	200	0.5%	0.6%	0.7%
Charles City, VA	0	0	45,439	0	0	0	10%	0	0.0%	0.0%	0.0%
Chesterfield, VA	2	112,861	62,226	31,074	48,786	1,529,976	10%	190	0.3%	0.3%	0.3%
Clarke, VA	0	0	54,853	0	0	0	10%	0	0.0%	0.0%	0.0%
Craig, VA	0	0	39,666	0	0	0	10%	0	0.0%	0.0%	0.0%
Culpeper, VA	2	8,599	48,144	632,005	646,595	989,802	10%	222	0.6%	0.6%	0.7%
Cumberland, VA	0	0	33,821	0	0	0	10%	0	0.0%	0.0%	0.0%
Dinwiddie, VA	0	0	44,203	0	0	0	10%	0	0.0%	0.0%	0.0%
Essex, VA	1	680	39,752	0	227,634	281,892	10%	78	0.2%	1.0%	1.2%
Fairfax, VA	3	340,713	86,158	0	3,600,731	10,159,814	10%	233	0.3%	0.3%	0.3%
Fauquier, VA	1	4,155	65,907	0	347,311	511,913	10%	353	0.5%	0.7%	0.7%
Fluvanna, VA	1	3,260	49,295	0	244,355	318,542	10%	271	0.5%	0.7%	0.7%
Frederick, VA	2	18,668	49,899	0	48,800	1,104,170	10%	255	0.5%	0.5%	0.6%
Giles, VA	0	0	37,128	0	0	0	10%	0	0.0%	0.0%	0.0%
Gloucester, VA	0	0	48,284	0	0	0	10%	0	0.0%	0.0%	0.0%
Goochland, VA	0	0	59,856	0	0	0	10%	0	0.0%	0.0%	0.0%
Greene, VA	0	0	48,826	0	0	0	10%	0	0.0%	0.0%	0.0%
Hanover, VA	3	30,753	62,956	501,226	654,803	985,370	10%	335	0.6%	0.6%	0.6%
Henrico, VA	2	340,315	52,285	0	7,521,996	16,181,460	10%	190	0.4%	0.4%	0.5%
Highland, VA	0	0	31,606	0	0	0	10%	0	0.0%	0.0%	0.0%
Isle Of Wight, VA	0	0	48,248	0	0	0	10%	0	0.0%	0.0%	0.0%
James City, VA	1	3,369	59,098	0	1,152,320	2,160,968	10%	144	0.2%	0.8%	1.2%
King And Queen, VA	0	0	38,206	0	0	0	10%	0	0.0%	0.0%	0.0%
King George, VA	2	2,970	53,026	0	60,237	168,383	10%	304	0.6%	0.6%	0.7%
King William, VA	2	2,198	53,019	0	470,828	601,224	10%	236	0.4%	0.8%	0.9%
Lancaster, VA	1	579	35,334	0	229,978	267,822	10%	456	1.3%	2.3%	2.5%
Loudoun, VA	4	18,738	85,731	1,253,044	1,516,811	2,444,966	10%	217	0.3%	0.3%	0.4%
Louisa, VA	0	0	41,885	0	0	0	10%	0	0.0%	0.0%	0.0%
Madison, VA	0	0	42,368	0	0	0	10%	0	0.0%	0.0%	0.0%

Exhibit H2-1. POTW MPS Screening Data and Variable Values

County	Number of Significant POTWs in 2010	Estimated Households Served in 2010	County MHI from 2000 Census	Estimated Annual Costs (Tier 1)	Estimated Annual Costs (Tier 2)	Estimated Annual Costs (Tier 3)	Estimated Grant Funding (% of Capital Costs)	Estimated Facility-weighted Current Sewer Rate	Estimated County MPS Screening Variable (Tier 1)	Estimated County MPS Screening Variable (Tier 2)	Estimated County MPS Screening Variable (Tier 3)
Mathews, VA	1	186	45,946	0	194,827	218,483	10%	213	0.5%	2.6%	2.8%
Middlesex, VA	1	325	39,199	0	208,781	234,940	10%	328	0.8%	2.4%	2.5%
Montgomery, VA	0	0	34,368	0	0	0	10%	0	0.0%	0.0%	0.0%
Nelson, VA	0	0	39,086	0	0	0	10%	0	0.0%	0.0%	0.0%
New Kent, VA	0	0	56,973	0	0	0	10%	0	0.0%	0.0%	0.0%
Northampton, VA	1	791	30,058	0	215,420	250,950	10%	168	0.6%	1.4%	1.5%
Northumberland, VA	1	304	40,532	0	210,544	237,207	10%	200	0.5%	2.1%	2.3%
Nottoway, VA	1	963	32,811	0	220,472	272,925	10%	263	0.8%	1.4%	1.6%
Orange, VA	3	5,302	45,592	283,574	797,007	1,069,949	10%	339	0.9%	1.0%	1.2%
Page, VA	1	1,928	35,461	0	0	331,150	10%	256	0.7%	0.7%	1.2%
Powhatan, VA	0	0	57,395	0	0	0	10%	0	0.0%	0.0%	0.0%
Prince Edward, VA	1	2,117	33,274	0	32,533	189,154	10%	123	0.4%	0.4%	0.6%
Prince George, VA	0	0	53,021	0	0	0	10%	0	0.0%	0.0%	0.0%
Prince William, VA	4	81,824	70,117	0	0	1,209,048	10%	288	0.4%	0.4%	0.4%
Rappahannock, VA	1	3,738	48,839	0	21,519	157,118	10%	727	1.5%	1.5%	1.6%
Richmond, VA	1	946	35,107	0	231,857	273,386	10%	451	1.3%	1.9%	2.0%
Roanoke, VA	0	0	50,695	0	0	0	10%	0	0.0%	0.0%	0.0%
Rockbridge, VA	1	2,007	38,306	0	29,851	225,946	10%	269	0.7%	0.7%	1.0%
Rockingham, VA	4	13,317	43,316	0	405,043	1,228,410	10%	159	0.4%	0.4%	0.6%
Shenandoah, VA	4	4,012	41,642	0	594,472	1,209,627	10%	279	0.7%	1.0%	1.3%
Spotsylvania, VA	2	11,065	61,151	0	13,603	683,162	10%	312	0.5%	0.5%	0.6%
Stafford, VA	4	42,377	71,020	964,075	981,201	1,902,190	10%	300	0.5%	0.5%	0.5%
Surry, VA	0	0	39,925	0	0	0	10%	0	0.0%	0.0%	0.0%
Warren, VA	1	4,688	45,096	0	6,116	470,038	10%	200	0.4%	0.4%	0.6%
Westmoreland, VA	1	1,803	38,053	7,304	35,650	325,038	10%	459	1.2%	1.3%	1.6%
York, VA	1	14,072	61,609	1,422,990	1,457,787	2,198,479	10%	378	0.8%	0.8%	0.8%
Alexandria City, VA	1	63,448	59,587	0	0	2,050,633	10%	249	0.4%	0.4%	0.5%
Buena Vista City, VA	1	2,266	34,453	0	364,127	530,012	10%	230	0.7%	1.1%	1.3%
Charlottesville City, VA	0	0	32,961	0	0	0	10%	0	0.0%	0.0%	0.0%
Chesapeake City, VA	2	137,415	53,941	0	9,008,496	11,178,234	10%	239	0.4%	0.6%	0.6%
Clifton Forge City, VA	1	706	27,734	0	346,979	501,278	10%	276	1.0%	2.6%	3.4%
Colonial Heights City, VA	0	0	45,948	0	0	0	10%	0	0.0%	0.0%	0.0%
Covington City, VA	1	13,252	32,236	0	442,552	634,727	10%	264	0.8%	0.9%	1.0%

Exhibit H2-1. POTW MPS Screening Data and Variable Values

County	Number of Significant POTWs in 2010	Estimated Households Served in 2010	County MHI from 2000 Census	Estimated Annual Costs (Tier 1)	Estimated Annual Costs (Tier 2)	Estimated Annual Costs (Tier 3)	Estimated Grant Funding (% of Capital Costs)	Estimated Facility-weighted Current Sewer Rate	Estimated County MPS Screening Variable (Tier 1)	Estimated County MPS Screening Variable (Tier 2)	Estimated County MPS Screening Variable (Tier 3)
Fairfax City, VA	0	0	71,905	0	0	0	10%	0	0.0%	0.0%	0.0%
Falls Church City, VA	0	0	79,646	0	0	0	10%	0	0.0%	0.0%	0.0%
Fredericksburg City, VA	0	0	36,765	0	0	0	10%	0	0.0%	0.0%	0.0%
Hampton City, VA	0	0	42,024	0	0	0	10%	0	0.0%	0.0%	0.0%
Harrisonburg City, VA	0	0	31,837	0	0	0	10%	0	0.0%	0.0%	0.0%
Hopewell City, VA	0	0	35,288	0	0	0	10%	0	0.0%	0.0%	0.0%
Lexington City, VA	0	0	30,809	0	0	0	10%	0	0.0%	0.0%	0.0%
Lynchburg City, VA	0	0	34,266	0	0	0	10%	0	0.0%	0.0%	0.0%
Manassas City, VA	0	0	64,216	0	0	0	10%	0	0.0%	0.0%	0.0%
Manassas Park City, VA	0	0	64,626	0	0	0	10%	0	0.0%	0.0%	0.0%
Newport News City, VA	0	0	38,904	0	0	0	10%	0	0.0%	0.0%	0.0%
Norfolk City, VA	2	180,561	33,820	0	10,573,273	12,811,593	10%	343	1.0%	1.2%	1.2%
Petersburg City, VA	1	17,233	30,669	906,867	960,315	1,590,921	10%	74	0.4%	0.4%	0.5%
Poquoson City, VA	0	0	64,759	0	0	0	10%	0	0.0%	0.0%	0.0%
Portsmouth City, VA	1	190,329	35,869	0	729,317	2,606,330	10%	343	1.0%	1.0%	1.0%
Richmond City, VA	1	99,435	33,082	6,455,540	6,653,912	7,891,946	10%	338	1.2%	1.2%	1.2%
Staunton City, VA	1	1,028	35,017	0	72,294	448,751	10%	197	0.6%	0.8%	1.7%
Suffolk, VA	0	0	43,706	0	0	0	10%	0	0.0%	0.0%	0.0%
Virginia Beach, VA	1	229,639	51,775	0	999,177	2,303,622	10%	147	0.3%	0.3%	0.3%
Waynesboro City, VA	0	0	34,746	0	0	0	10%	0	0.0%	0.0%	0.0%
Williamsburg City, VA	0	0	39,431	0	0	0	10%	0	0.0%	0.0%	0.0%
Winchester City, VA	0	0	36,499	0	0	0	10%	0	0.0%	0.0%	0.0%
Berkeley, WV	3	18,417	41,206	0	907,253	1,306,353	0%	347	0.8%	1.0%	1.0%
Grant, WV	1	960	30,738	0	212,994	288,666	0%	200	0.7%	1.4%	1.6%
Hampshire, WV	1	1,070	33,662	0	190,158	241,817	0%	270	0.8%	1.3%	1.5%
Hardy, WV	1	1,148	33,853	0	10,349	49,845	0%	200	0.6%	0.6%	0.6%
Jefferson, WV	1	4,863	47,171	0	234,891	332,165	0%	239	0.5%	0.6%	0.7%
Mineral, WV	1	6,979	33,112	0	273,009	401,532	0%	312	0.9%	1.1%	1.1%
Monroe, WV	0	0	29,313	0	0	0	0%	0	0.0%	0.0%	0.0%
Morgan, WV	0	0	37,223	0	0	0	0%	0	0.0%	0.0%	0.0%
Pendleton, WV	0	0	32,347	0	0	0	0%	0	0.0%	0.0%	0.0%

Note: Costs (see Appendix E for documentation), MHI, and Estimated Facility-Weighted Current Sewer Rate are in 2001 $.

Exhibit H2-2. Industrial Point Screening Variable Values

County	Number of Significant Facilities	Estimated Annual Costs (Tier 1)	Estimated Annual Costs (Tier 2)	Estimated Annual Costs (Tier 3)	Earnings from Industrial Sectors Containing Significant Dischargers
Kent, DE	0	0	0	0	0.0%
New Castle, DE	0	0	0	0	0.0%
Sussex, DE	1	0	0	0	0.0%
Washington, DC	0	0	0	0	0.0%
Allegany, MD	1	0	0	109,197	nd
Anne Arundel, MD	1	0	0	0	0.0%
Baltimore, MD	1	0	0	0	0.0%
Calvert, MD	0	0	0	0	0.0%
Caroline, MD	0	0	0	0	0.0%
Carroll, MD	1	0	0	45,153	13.7%
Cecil, MD	0	0	0	0	0.0%
Charles, MD	1	0	19,788	22,412	4.0%
Dorchester, MD	0	0	0	0	0.0%
Frederick, MD	0	0	0	0	0.0%
Garrett, MD	1	0	0	0	0.0%
Harford, MD	0	0	0	0	0.0%
Howard, MD	1	0	810,004	867,134	0.6%
Kent, MD	0	0	0	0	0.0%
Montgomery, MD	0	0	0	0	0.0%
Prince Georges, MD	0	0	0	0	0.0%
Queen Annes, MD	0	0	0	0	0.0%
St Marys, MD	0	0	0	0	0.0%
Somerset, MD	0	0	0	0	0.0%
Talbot, MD	1	0	0	0	0.0%
Washington, MD	1	0	827,468	1,654,936	17.7%
Wicomico, MD	0	0	0	0	0.0%
Worcester, MD	0	0	0	0	0.0%
Baltimore City, MD	1	0	0	0	0.0%
Allegany, NY	0	0	0	0	0.0%
Broome, NY	0	0	0	0	0.0%
Chemung, NY	0	0	0	0	0.0%
Chenango, NY	0	0	0	0	0.0%
Cortland, NY	0	0	0	0	0.0%
Delaware, NY	0	0	0	0	0.0%
Herkimer, NY	0	0	0	0	0.0%
Livingston, NY	0	0	0	0	0.0%

Exhibit H2-2. Industrial Point Screening Variable Values

County	Number of Significant Facilities	Estimated Annual Costs (Tier 1)	Estimated Annual Costs (Tier 2)	Estimated Annual Costs (Tier 3)	Earnings from Industrial Sectors Containing Significant Dischargers
Madison, NY	0	0	0	0	0.0%
Oneida, NY	0	0	0	0	0.0%
Onondaga, NY	0	0	0	0	0.0%
Ontario, NY	0	0	0	0	0.0%
Otsego, NY	0	0	0	0	0.0%
Schoharie, NY	0	0	0	0	0.0%
Schuyler, NY	0	0	0	0	0.0%
Steuben, NY	0	0	0	0	0.0%
Tioga, NY	0	0	0	0	0.0%
Tompkins, NY	0	0	0	0	0.0%
Yates, NY	0	0	0	0	0.0%
Adams, PA	0	0	0	0	0.0%
Bedford, PA	0	0	0	0	0.0%
Berks, PA	0	0	0	0	0.0%
Blair, PA	1	0	0	23,341	3.4%
Bradford, PA	1	0	0	5,863	26.6%
Cambria, PA	0	0	0	0	0.0%
Cameron, PA	0	0	0	0	0.0%
Centre, PA	4	0	0	374,505	0.6%
Chester, PA	0	0	0	0	0.0%
Clearfield, PA	0	0	0	0	0.0%
Clinton, PA	2	0	0	0	0.0%
Columbia, PA	1	0	483,203	558,594	8.7%
Cumberland, PA	1	0	0	0	0.0%
Dauphin, PA	1	0	0	46,890	15.1%
Elk, PA	0	0	0	0	0.0%
Franklin, PA	0	0	0	0	0.0%
Fulton, PA	0	0	0	0	0.0%
Huntingdon, PA	0	0	0	0	0.0%
Indiana, PA	0	0	0	0	0.0%
Jefferson, PA	0	0	0	0	0.0%
Juniata, PA	1	0	0	145,808	nd
Lackawanna, PA	0	0	0	0	0.0%
Lancaster, PA	1	0	150,556	249,614	4.2%
Lebanon, PA	0	0	0	0	0.0%
Luzerne, PA	1	0	0	179,708	0.6%

Exhibit H2-2. Industrial Point Screening Variable Values

County	Number of Significant Facilities	Estimated Annual Costs (Tier 1)	Estimated Annual Costs (Tier 2)	Estimated Annual Costs (Tier 3)	Earnings from Industrial Sectors Containing Significant Dischargers
Lycoming, PA	0	0	0	0	0.0%
Mckean, PA	0	0	0	0	0.0%
Mifflin, PA	0	0	0	0	0.0%
Montour, PA	0	0	0	0	0.0%
Northumberland, PA	2	0	87,747	158,024	nd
Perry, PA	0	0	0	0	0.0%
Potter, PA	0	0	0	0	0.0%
Schuylkill, PA	1	0	0	90,319	24.9%
Snyder, PA	0	0	0	0	0.0%
Somerset, PA	0	0	0	0	0.0%
Sullivan, PA	0	0	0	0	0.0%
Susquehanna, PA	0	0	0	0	0.0%
Tioga, PA	0	0	0	0	0.0%
Union, PA	0	0	0	0	0.0%
Wayne, PA	0	0	0	0	0.0%
Wyoming, PA	1	0	541,937	892,513	nd
York, PA	1	0	505,990	1,160,242	2.8%
Accomack, VA	1	0	424,523	500,476	17.3%
Albemarle, VA	0	0	0	0	0.0%
Alleghany, VA	2	0	0	1,362,943	nd
Amelia, VA	0	0	0	0	0.0%
Amherst, VA	1	0	0	2,588	11.9%
Appomattox, VA	0	0	0	0	0.0%
Arlington City, VA	0	0	0	0	0.0%
Augusta, VA	0	0	0	0	0.0%
Bath, VA	0	0	0	0	0.0%
Bedford, VA	1	0	408,151	447,095	nd
Botetourt, VA	0	0	0	0	0.0%
Buckingham, VA	0	0	0	0	0.0%
Campbell, VA	0	0	0	0	0.0%
Caroline, VA	0	0	0	0	0.0%
Charles City, VA	0	0	0	0	0.0%
Chesterfield, VA	3	0	1,604,401	4,298,259	9.8%
Clarke, VA	0	0	0	0	0.0%
Craig, VA	0	0	0	0	0.0%
Culpeper, VA	0	0	0	0	0.0%

Exhibit H2-2. Industrial Point Screening Variable Values

County	Number of Significant Facilities	Estimated Annual Costs (Tier 1)	Estimated Annual Costs (Tier 2)	Estimated Annual Costs (Tier 3)	Earnings from Industrial Sectors Containing Significant Dischargers
Cumberland, VA	0	0	0	0	0.0%
Dinwiddie, VA	0	0	0	0	0.0%
Essex, VA	0	0	0	0	0.0%
Fairfax, VA	0	0	0	0	0.0%
Fauquier, VA	0	0	0	0	0.0%
Fluvanna, VA	1	0	0	14,024	nd
Frederick, VA	0	0	0	0	0.0%
Giles, VA	0	0	0	0	0.0%
Gloucester, VA	0	0	0	0	0.0%
Goochland, VA	0	0	0	0	0.0%
Greene, VA	0	0	0	0	0.0%
Hanover, VA	0	0	0	0	0.0%
Henrico, VA	0	0	0	0	0.0%
Highland, VA	0	0	0	0	0.0%
Isle Of Wight, VA	0	0	0	0	0.0%
James City, VA	0	0	0	0	0.0%
King And Queen, VA	0	0	0	0	0.0%
King George, VA	0	0	0	0	0.0%
King William, VA	1	0	35,786	135,464	nd
Lancaster, VA	0	0	0	0	0.0%
Loudoun, VA	0	0	0	0	0.0%
Louisa, VA	0	0	0	0	0.0%
Madison, VA	0	0	0	0	0.0%
Mathews, VA	0	0	0	0	0.0%
Middlesex, VA	0	0	0	0	0.0%
Montgomery, VA	0	0	0	0	0.0%
Nelson, VA	0	0	0	0	0.0%
New Kent, VA	0	0	0	0	0.0%
Northampton, VA	0	0	0	0	0.0%
Northumberland, VA	0	0	0	0	0.0%
Nottoway, VA	0	0	0	0	0.0%
Orange, VA	0	0	0	0	0.0%
Page, VA	0	0	0	0	0.0%
Powhatan, VA	0	0	0	0	0.0%
Prince Edward, VA	0	0	0	0	0.0%
Prince George, VA	0	0	0	0	0.0%

Exhibit H2-2. Industrial Point Screening Variable Values

County	Number of Significant Facilities	Estimated Annual Costs (Tier 1)	Estimated Annual Costs (Tier 2)	Estimated Annual Costs (Tier 3)	Earnings from Industrial Sectors Containing Significant Dischargers
Prince William, VA	0	0	0	0	0.0%
Rappahannock, VA	0	0	0	0	0.0%
Richmond, VA	0	0	0	0	0.0%
Roanoke, VA	0	0	0	0	0.0%
Rockbridge, VA	1	0	170,987	170,987	24.9%
Rockingham, VA	4	0	712,998	913,675	nd
Shenandoah, VA	1	0	328,979	328,979	7.5%
Spotsylvania, VA	0	0	0	0	0.0%
Stafford, VA	0	0	0	0	0.0%
Surry, VA	0	0	0	0	0.0%
Warren, VA	0	0	0	0	0.0%
Westmoreland, VA	0	0	0	0	0.0%
York, VA	1	0	0	0	0.0%
Alexandria City, VA	0	0	0	0	0.0%
Buena Vista City, VA	0	0	0	0	0.0%
Charlottesville City, VA	0	0	0	0	0.0%
Chesapeake City, VA	0	0	0	0	0.0%
Clifton Forge City, VA	0	0	0	0	0.0%
Colonial Heights City, VA	0	0	0	0	0.0%
Covington City, VA	0	0	0	0	0.0%
Fairfax City, VA	0	0	0	0	0.0%
Falls Church City, VA	0	0	0	0	0.0%
Fredericksburg City, VA	0	0	0	0	0.0%
Hampton City, VA	0	0	0	0	0.0%
Harrisonburg City, VA	0	0	0	0	0.0%
Hopewell City, VA	0	0	0	0	0.0%
Lexington City, VA	1	0	0	0	nd
Lynchburg City, VA	0	0	0	0	0.0%
Manassas City, VA	0	0	0	0	0.0%
Manassas Park City, VA	0	0	0	0	0.0%
Newport News City, VA	0	0	0	0	0.0%
Norfolk City, VA	0	0	0	0	0.0%
Petersburg City, VA	0	0	0	0	0.0%
Poquoson City, VA	0	0	0	0	0.0%
Portsmouth City, VA	1	0	0	0	0.0%
Richmond City, VA	0	0	0	0	0.0%

Exhibit H2-2. Industrial Point Screening Variable Values

County	Number of Significant Facilities	Estimated Annual Costs (Tier 1)	Estimated Annual Costs (Tier 2)	Estimated Annual Costs (Tier 3)	Earnings from Industrial Sectors Containing Significant Dischargers
Staunton City, VA	0	0	0	0	0.0%
Suffolk, VA	0	0	0	0	0.0%
Virginia Beach, VA	0	0	0	0	0.0%
Waynesboro City, VA	1	0	0	0	0.0%
Williamsburg City, VA	0	0	0	0	0.0%
Winchester City, VA	0	0	0	0	0.0%
Berkeley, WV	0	0	0	0	0.0%
Grant, WV	1	0	0	0	0.0%
Hampshire, WV	0	0	0	0	0.0%
Hardy, WV	2	0	0	0	0.0%
Jefferson, WV	2	0	559,099	611,642	nd
Mineral, WV	0	0	0	0	0.0%
Monroe, WV	0	0	0	0	0.0%
Morgan, WV	0	0	0	0	0.0%
Pendleton, WV	0	0	0	0	0.0%

Note: Costs are in 2001 $ (see Appendix E for documentation).
nd = No data.

Exhibit H2-3. Forestry Screening Variable Values

County	Total Earnings by Place of Work	Earnings from Forestry	Estimated Earnings from Logging	Estimated Percent of Earnings from Forestry and Logging
Kent, DE	2,039,275	nd	72	0.0%
New Castle, DE	13,863,912	88	nd	0.0%
Sussex, DE	1,982,230	nd	1,273	0.1%
Washington, DC	43,938,229	65	nd	0.0%
Allegany, MD	977,419	77	193	0.0%
Anne Arundel, MD	10,001,371	243	421	0.0%
Baltimore, MD	15,135,520	nd	899	0.0%
Calvert, MD	685,969	nd	280	0.0%
Caroline, MD	299,735	50	nd	0.0%
Carroll, MD	1,592,011	nd	2,758	0.2%
Cecil, MD	933,416	nd	157	0.0%
Charles, MD	1,318,010	nd	268	0.0%
Dorchester, MD	368,816	nd	453	0.1%
Frederick, MD	2,919,653	nd	623	0.0%
Garrett, MD	358,897	nd	1,758	0.5%
Harford, MD	2,738,241	nd	1,090	0.0%
Howard, MD	5,731,937	0	225	0.0%
Kent, MD	248,173	0	nd	0.0%
Montgomery, MD	24,621,057	nd	1,801	0.0%
Prince Georges, MD	14,035,273	nd	1,533	0.0%
Queen Annes, MD	371,515	159	848	0.3%
St Marys, MD	1,717,060	90	144	0.0%
Somerset, MD	235,930	nd	314	0.1%
Talbot, MD	661,244	75	255	0.0%
Washington, MD	2,142,400	0	864	0.0%
Wicomico, MD	1,381,510	nd	1,567	0.1%
Worcester, MD	680,474	nd	365	0.1%
Baltimore City, MD	18,529,005	0	1,144	0.0%
Allegany, NY	481,798	nd	201	0.0%
Broome, NY	3,622,369	110	375	0.0%
Chemung, NY	1,421,704	127	188	0.0%
Chenango, NY	587,691	nd	597	0.1%
Cortland, NY	625,288	99	1,231	0.2%
Delaware, NY	608,754	nd	1,889	0.3%
Herkimer, NY	564,148	228	552	0.1%
Livingston, NY	644,184	52	271	0.1%
Madison, NY	768,287	nd	177	0.0%

Exhibit H2-3. Forestry Screening Variable Values

County	Total Earnings by Place of Work	Earnings from Forestry	Estimated Earnings from Logging	Estimated Percent of Earnings from Forestry and Logging
Oneida, NY	3,731,664	749	1,543	0.1%
Onondaga, NY	10,018,542	nd	1,591	0.0%
Ontario, NY	1,594,362	nd	342	0.0%
Otsego, NY	798,567	197	1,490	0.2%
Schoharie, NY	312,271	0	164	0.1%
Schuyler, NY	146,657	0	nd	0.0%
Steuben, NY	1,733,968	nd	167	0.0%
Tioga, NY	589,828	nd	864	0.1%
Tompkins, NY	1,827,391	0	156	0.0%
Yates, NY	202,487	0	39	0.0%
Adams, PA	1,027,775	nd	3,124	0.3%
Bedford, PA	570,201	nd	1,049	0.2%
Berks, PA	6,723,232	nd	2,532	0.0%
Blair, PA	2,148,324	93	1,752	0.1%
Bradford, PA	820,074	1,411	4,137	0.7%
Cambria, PA	2,013,797	nd	1,871	0.1%
Cameron, PA	90,614	0	nd	0.0%
Centre, PA	2,512,858	541	610	0.0%
Chester, PA	11,821,531	nd	2,015	0.0%
Clearfield, PA	1,075,938	nd	4,758	0.4%
Clinton, PA	432,719	359	1,604	0.5%
Columbia, PA	877,277	nd	2,453	0.3%
Cumberland, PA	5,353,631	nd	592	0.0%
Dauphin, PA	6,999,611	217	756	0.0%
Elk, PA	599,144	nd	873	0.1%
Franklin, PA	1,784,613	nd	2,181	0.1%
Fulton, PA	229,022	136	504	0.3%
Huntingdon, PA	446,043	nd	705	0.2%
Indiana, PA	1,280,070	nd	582	0.0%
Jefferson, PA	585,272	nd	2,559	0.4%
Juniata, PA	211,337	nd	3,155	1.5%
Lackawanna, PA	3,442,236	nd	3,063	0.1%
Lancaster, PA	8,802,212	nd	nd	0.0%
Lebanon, PA	1,518,238	nd	4,942	0.3%
Luzerne, PA	5,053,274	nd	577	0.0%
Lycoming, PA	1,840,136	316	4,244	0.2%
Mckean, PA	669,049	456	5,705	0.9%

Exhibit H2-3. Forestry Screening Variable Values

County	Total Earnings by Place of Work	Earnings from Forestry	Estimated Earnings from Logging	Estimated Percent of Earnings from Forestry and Logging
Mifflin, PA	576,252	0	2,331	0.4%
Montour, PA	571,838	0	0	0.0%
Northumberland, PA	1,054,416	nd	3,339	0.3%
Perry, PA	279,507	nd	2,066	0.7%
Potter, PA	277,206	nd	1,546	0.6%
Schuylkill, PA	1,734,163	840	3,557	0.3%
Snyder, PA	548,450	710	11,453	2.2%
Somerset, PA	938,600	962	1,508	0.3%
Sullivan, PA	60,542	0	749	1.2%
Susquehanna, PA	340,995	nd	1,555	0.5%
Tioga, PA	448,494	nd	1,004	0.2%
Union, PA	626,139	0	4,265	0.7%
Wayne, PA	478,431	nd	658	0.1%
Wyoming, PA	418,329	nd	1,579	0.4%
York, PA	6,639,370	nd	6,660	0.1%
Accomack, VA	385,971	0	285	0.1%
Albemarle, VA	3,090,845	nd	1,048	0.0%
Alleghany, VA	372,561	0	nd	0.0%
Amelia, VA	90,307	nd	678	0.8%
Amherst, VA	311,689	296	1,144	0.5%
Appomattox, VA	121,823	nd	268	0.2%
Arlington City, VA	11,023,743	0	nd	0.0%
Augusta, VA	1,650,282	nd	nd	0.0%
Bath, VA	77,988	nd	158	0.2%
Bedford, VA	548,578	nd	nd	0.0%
Botetourt, VA	261,559	nd	nd	0.0%
Buckingham, VA	108,731	1,893	926	2.6%
Campbell, VA	2,551,331	nd	2,714	0.1%
Caroline, VA	171,961	0	1,897	1.1%
Charles City, VA	45,541	0	418	0.9%
Chesterfield, VA	4,174,031	nd	412	0.0%
Clarke, VA	140,466	0	1,313	0.9%
Craig, VA	21,059	0	46	0.2%
Culpeper, VA	461,111	601	2,163	0.6%
Cumberland, VA	44,600	0	386	0.9%
Dinwiddie, VA	1,090,679	0	nd	0.0%
Essex, VA	111,004	nd	216	0.2%

Exhibit H2-3. Forestry Screening Variable Values

County	Total Earnings by Place of Work	Earnings from Forestry	Estimated Earnings from Logging	Estimated Percent of Earnings from Forestry and Logging
Fairfax, VA	33,243,794	0	nd	0.0%
Fauquier, VA	608,709	nd	564	0.1%
Fluvanna, VA	121,740	nd	63	0.1%
Frederick, VA	1,600,726	379	nd	0.0%
Giles, VA	205,407	0	nd	0.0%
Gloucester, VA	252,598	1,489	180	0.7%
Goochland, VA	280,123	0	327	0.1%
Greene, VA	104,875	nd	nd	0.0%
Hanover, VA	1,396,850	0	1,117	0.1%
Henrico, VA	6,786,119	0	882	0.0%
Highland, VA	20,040	0	319	1.6%
Isle Of Wight, VA	483,290	nd	88	0.0%
James City, VA	1,237,134	0	81	0.0%
King And Queen, VA	43,906	nd	509	1.2%
King George, VA	566,348	nd	99	0.0%
King William, VA	137,256	nd	721	0.5%
Lancaster, VA	135,568	0	60	0.0%
Loudoun, VA	4,950,267	nd	2,423	0.0%
Louisa, VA	272,613	nd	1,715	0.6%
Madison, VA	106,900	nd	1,480	1.4%
Mathews, VA	49,922	0	44	0.1%
Middlesex, VA	83,719	0	230	0.3%
Montgomery, VA	1,425,523	nd	760	0.1%
Nelson, VA	110,114	478	450	0.8%
New Kent, VA	84,341	474	652	1.3%
Northampton, VA	142,946	0	nd	0.0%
Northumberland, VA	89,323	0	nd	0.0%
Nottoway, VA	195,975	nd	867	0.4%
Orange, VA	244,767	0	nd	0.0%
Page, VA	209,779	0	nd	0.0%
Powhatan, VA	175,809	0	nd	0.0%
Prince Edward, VA	242,352	70	239	0.1%
Prince George, VA	1,046,057	nd	651	0.1%
Prince William, VA	4,168,219	0	nd	0.0%
Rappahannock, VA	64,274	0	nd	0.0%
Richmond, VA	95,521	0	625	0.7%
Roanoke, VA	2,157,463	0	1,452	0.1%

Exhibit H2-3. Forestry Screening Variable Values

County	Total Earnings by Place of Work	Earnings from Forestry	Estimated Earnings from Logging	Estimated Percent of Earnings from Forestry and Logging
Rockbridge, VA	427,412	nd	1,648	0.4%
Rockingham, VA	1,808,314	nd	nd	0.0%
Shenandoah, VA	433,993	0	1,837	0.4%
Spotsylvania, VA	1,496,525	nd	1,195	0.1%
Stafford, VA	908,119	0	292	0.0%
Surry, VA	102,585	0	285	0.3%
Warren, VA	315,953	0	nd	0.0%
Westmoreland, VA	99,868	0	nd	0.0%
York, VA	617,987	0	388	0.1%
Alexandria City, VA	4,677,085	nd	nd	0.0%
Buena Vista City, VA	427,412	nd	1,648	0.4%
Charlottesville City, VA	3,090,845	nd	1,048	0.0%
Chesapeake City, VA	2,628,866	nd	1,752	0.1%
Clifton Forge City, VA	372,561	0	nd	0.0%
Colonial Heights City, VA	1,090,679	0	nd	0.0%
Covington City, VA	372,561	0	nd	0.0%
Fairfax City, VA	33,243,794	0	nd	0.0%
Falls Church City, VA	33,243,794	0	nd	0.0%
Fredericksburg City, VA	1,496,525	nd	1,195	0.1%
Hampton City, VA	2,891,439	0	408	0.0%
Harrisonburg City, VA	1,808,314	nd	nd	0.0%
Hopewell City, VA	1,046,057	nd	651	0.1%
Lexington City, VA	427,412	nd	1,648	0.4%
Lynchburg City, VA	2,551,331	nd	2,714	0.1%
Manassas City, VA	4,168,219	0	nd	0.0%
Manassas Park City, VA	4,168,219	0	nd	0.0%
Newport News City, VA	3,709,695	0	734	0.0%
Norfolk City, VA	8,523,202	0	nd	0.0%
Petersburg City, VA	1,090,679	0	nd	0.0%
Poquoson City, VA	617,987	0	388	0.1%
Portsmouth City, VA	1,911,113	0	125	0.0%
Richmond City, VA	7,878,253	nd	1,528	0.0%
Staunton City, VA	1,650,282	nd	nd	0.0%
Suffolk, VA	662,363	nd	823	0.1%
Virginia Beach, VA	6,430,500	nd	407	0.0%
Waynesboro City, VA	1,650,282	nd	nd	0.0%
Williamsburg City, VA	1,237,134	0	81	0.0%

Exhibit H2-3. Forestry Screening Variable Values

County	Total Earnings by Place of Work	Earnings from Forestry	Estimated Earnings from Logging	Estimated Percent of Earnings from Forestry and Logging
Winchester City, VA	1,600,726	379	nd	0.0%
Berkeley, WV	939,798	nd	491	0.1%
Grant, WV	145,728	nd	1,509	1.0%
Hampshire, WV	118,663	nd	760	0.6%
Hardy, WV	154,880	0	nd	0.0%
Jefferson, WV	392,545	nd	248	0.1%
Mineral, WV	201,366	255	1,223	0.7%
Monroe, WV	71,140	0	550	0.8%
Morgan, WV	98,605	111	nd	0.1%
Pendleton, WV	77,833	410	nd	0.5%

Note: Earnings are in thousands of 1999 $.
nd = No data.

Exhibit H2-4. Agriculture Screening Variable Values

County	Percent of Earnings from Agriculture	Percent of Earnings from Agriculture and Related Sectors	Estimated BMP Costs as Percent of NCR (Tier 1)	Estimated BMP Costs as Percent of NCR (Tier 2)	Estimated BMP Costs as Percent of NCR (Tier 3)	Estimated Per-Farm BMP Costs as Percent of County MHI (Tier 1)	Estimated Per-Farm BMP Costs as Percent of County MHI (Tier 2)	Estimated Per-Farm BMP Costs as Percent of County MHI (Tier 3)	Estimated Crop BMP Costs as Percent of Crop Sales (Tier 1)	Estimated Crop BMP Costs as Percent of Crop Sales (Tier 2)	Estimated Crop BMP Costs as Percent of Crop Sales (Tier 3)	Estimated Livestock BMP Costs as Percent of Livestock Sales (Tier 1)	Estimated Livestock BMP Costs as Percent of Livestock Sales (Tier 2)	Estimated Livestock BMP Costs as Percent of Livestock Sales (Tier 3)
Kent, DE	1.3%	1.3%	3.3%	6.6%	9.7%	2.3%	4.7%	7.0%	1.0%	1.9%	2.6%	0.0%	0.1%	0.3%
New Castle, DE	0.1%	0.1%	2.3%	4.7%	7.0%	1.3%	2.8%	4.2%	0.6%	1.3%	1.8%	0.0%	0.1%	0.4%
Sussex, DE	4.6%	15.0%	2.0%	4.0%	5.8%	2.3%	4.7%	6.9%	1.0%	2.0%	2.8%	0.0%	0.0%	0.1%
Washington, DC	0.0%	0.0%	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Allegany, MD	-0.0%	0.9%	36.0%	46.9%	70.7%	0.9%	1.1%	1.7%	0.1%	-1.0%	-2.3%	3.7%	5.3%	8.5%
Anne Arundel, MD	0.1%	0.2%	-1.9%	-1.6%	-1.6%	-0.4%	-0.4%	-0.4%	-0.5%	-0.4%	-0.4%	-0.9%	-0.9%	-0.8%
Baltimore, MD	0.3%	2.2%	-0.5%	-0.4%	-0.4%	-0.2%	-0.2%	-0.2%	-0.1%	-0.1%	-0.1%	-0.2%	-0.2%	-0.0%
Calvert, MD	-0.0%	0.9%	-2.6%	-2.2%	-1.8%	-0.3%	-0.3%	-0.2%	-0.7%	-0.7%	-0.8%	0.4%	1.0%	2.5%
Caroline, MD	2.5%	6.6%	-6.1%	-6.1%	-6.3%	-2.2%	-2.2%	-2.2%	-1.0%	-1.0%	-1.2%	-0.0%	-0.0%	0.0%
Carroll, MD	1.1%	3.3%	3.6%	4.1%	4.5%	0.7%	0.8%	0.9%	0.9%	1.1%	0.8%	0.4%	0.5%	0.7%
Cecil, MD	2.7%	2.8%	3.0%	4.1%	5.5%	0.8%	1.1%	1.5%	0.5%	0.6%	0.4%	0.2%	0.4%	0.8%
Charles, MD	0.1%	0.6%	-0.5%	0.5%	0.7%	-0.1%	0.1%	0.2%	-0.0%	0.2%	0.2%	-1.0%	-0.6%	0.4%
Dorchester, MD	4.4%	15.9%	-0.2%	-0.9%	-1.7%	-0.4%	-1.7%	-3.2%	-0.1%	-0.3%	-0.7%	-0.0%	-0.0%	0.1%
Frederick, MD	1.1%	1.9%	4.7%	4.8%	4.4%	0.7%	0.7%	0.7%	1.6%	1.8%	1.1%	0.3%	0.3%	0.4%
Garrett, MD	3.2%	3.5%	5.1%	7.5%	11.9%	0.9%	1.3%	2.1%	3.4%	2.8%	1.0%	0.7%	1.3%	2.4%
Harford, MD	0.9%	2.3%	-0.3%	0.2%	0.4%	-0.1%	0.1%	0.1%	0.0%	0.3%	0.1%	-0.1%	-0.1%	0.1%
Howard, MD	0.3%	0.9%	-0.9%	-0.2%	0.2%	-0.2%	-0.1%	0.0%	-0.2%	-0.1%	-0.2%	-0.0%	0.1%	0.3%
Kent, MD	8.4%	10.3%	-5.2%	-4.3%	-3.5%	-2.3%	-1.9%	-1.5%	-1.2%	-1.2%	-1.3%	0.5%	0.6%	1.0%
Montgomery, MD	0.1%	0.2%	1.8%	2.4%	2.7%	0.2%	0.3%	0.3%	0.4%	0.5%	0.4%	-0.1%	-0.0%	0.4%

Exhibit H2-4. Agriculture Screening Variable Values

County	Percent of Earnings from Agriculture	Percent of Earnings from Agriculture and Related Sectors	Estimated BMP Costs as Percent of NCR (Tier 1)	Estimated BMP Costs as Percent of NCR (Tier 2)	Estimated BMP Costs as Percent of NCR (Tier 3)	Estimated Per-Farm BMP Costs as Percent of County MHI (Tier 1)	Estimated Per-Farm BMP Costs as Percent of County MHI (Tier 2)	Estimated Per-Farm BMP Costs as Percent of County MHI (Tier 3)	Estimated Crop BMP Costs as Percent of Crop Sales (Tier 1)	Estimated Crop BMP Costs as Percent of Crop Sales (Tier 2)	Estimated Crop BMP Costs as Percent of Crop Sales (Tier 3)	Estimated Livestock BMP Costs as Percent of Livestock Sales (Tier 1)	Estimated Livestock BMP Costs as Percent of Livestock Sales (Tier 2)	Estimated Livestock BMP Costs as Percent of Livestock Sales (Tier 3)
Prince Georges, MD	0.1%	0.9%	-2.1%	-2.0%	-1.9%	-0.7%	-0.7%	-0.6%	-0.7%	-0.8%	-0.9%	1.0%	1.6%	2.7%
Queen Annes, MD	1.9%	6.5%	2.6%	2.9%	2.9%	1.4%	1.6%	1.6%	0.8%	0.9%	0.8%	-0.0%	-0.0%	0.2%
St Marys, MD	0.0%	0.0%	-0.4%	-0.1%	-0.1%	-0.1%	-0.0%	-0.0%	-0.0%	0.1%	0.0%	-0.6%	-0.5%	-0.3%
Somerset, MD	2.2%	3.0%	profit < 0	profit < 0	profit < 0	-1.3%	-0.3%	-0.0%	-0.5%	-0.2%	-0.6%	0.0%	0.0%	0.1%
Talbot, MD	1.3%	1.3%	1.1%	1.5%	2.1%	0.9%	1.3%	1.8%	0.3%	0.3%	0.1%	0.1%	0.2%	0.6%
Washington, MD	0.4%	1.6%	4.2%	5.0%	5.5%	2.3%	2.7%	2.9%	2.1%	2.6%	2.1%	0.7%	0.9%	1.2%
Wicomico, MD	2.7%	9.1%	-0.2%	-0.1%	-0.1%	-0.3%	-0.2%	-0.2%	-0.3%	-0.3%	-0.5%	0.0%	0.0%	0.1%
Worcester, MD	4.0%	9.6%	-0.1%	-0.1%	-0.2%	-0.3%	-0.2%	-0.6%	-0.1%	-0.0%	-0.5%	-0.0%	-0.0%	0.0%
Baltimore City, MD	0.0%	1.0%	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Allegany, NY	2.8%	6.3%	1.2%	8.6%	18.3%	0.3%	2.1%	4.4%	0.0%	4.0%	8.0%	0.2%	1.0%	2.1%
Broome, NY	0.2%	1.6%	2.1%	5.4%	9.4%	0.5%	1.2%	2.2%	0.5%	1.8%	3.2%	0.3%	0.6%	1.0%
Chemung, NY	0.3%	0.3%	2.2%	18.2%	40.4%	0.2%	1.9%	4.1%	-0.0%	1.8%	3.8%	0.3%	1.6%	3.7%
Chenango, NY	1.4%	4.4%	1.6%	7.1%	14.8%	0.6%	2.6%	5.5%	0.1%	3.2%	6.4%	0.3%	1.0%	2.2%
Cortland, NY	0.8%	0.8%	1.1%	5.6%	12.0%	0.5%	2.4%	5.2%	0.1%	2.5%	5.0%	0.2%	0.6%	1.4%
Delaware, NY	1.7%	1.7%	0.4%	5.9%	14.3%	0.2%	2.8%	6.9%	-0.0%	0.1%	0.4%	0.1%	1.3%	3.1%
Herkimer, NY	1.8%	3.5%	0.0%	5.0%	12.2%	0.0%	2.8%	6.8%	0.0%	2.4%	5.0%	0.0%	0.7%	1.8%
Livingston, NY	1.4%	2.0%	0.8%	5.6%	12.0%	0.4%	3.1%	6.6%	0.3%	1.7%	3.1%	0.0%	0.5%	1.3%
Madison, NY	1.4%	2.9%	1.6%	4.1%	7.3%	1.0%	2.4%	4.3%	0.0%	1.9%	4.0%	0.4%	0.7%	1.2%
Oneida, NY	0.4%	1.5%	0.0%	2.4%	5.6%	0.0%	2.5%	5.7%	0.0%	1.3%	2.7%	0.0%	0.5%	1.3%

Exhibit H2-4. Agriculture Screening Variable Values

County	Percent of Earnings from Agriculture	Percent of Earnings from Agriculture and Related Sectors	Estimated BMP Costs as Percent of NCR (Tier 1)	Estimated BMP Costs as Percent of NCR (Tier 2)	Estimated BMP Costs as Percent of NCR (Tier 3)	Estimated Per-Farm BMP Costs as Percent of County MHI (Tier 1)	Estimated Per-Farm BMP Costs as Percent of County MHI (Tier 2)	Estimated Per-Farm BMP Costs as Percent of County MHI (Tier 3)	Estimated Crop BMP Costs as Percent of Crop Sales (Tier 1)	Estimated Crop BMP Costs as Percent of Crop Sales (Tier 2)	Estimated Crop BMP Costs as Percent of Crop Sales (Tier 3)	Estimated Livestock BMP Costs as Percent of Livestock Sales (Tier 1)	Estimated Livestock BMP Costs as Percent of Livestock Sales (Tier 2)	Estimated Livestock BMP Costs as Percent of Livestock Sales (Tier 3)
Onondaga, NY	0.1%	1.5%	0.0%	3.8%	8.7%	0.0%	2.7%	6.2%	0.0%	1.5%	3.2%	0.0%	0.4%	1.0%
Ontario, NY	0.8%	4.1%	0.0%	5.8%	13.3%	0.0%	2.7%	6.1%	0.0%	1.1%	2.4%	0.0%	0.5%	1.4%
Otsego, NY	0.8%	1.8%	0.9%	6.3%	13.8%	0.3%	2.3%	5.1%	0.0%	3.2%	6.6%	0.2%	0.9%	2.1%
Schoharie, NY	2.3%	2.3%	0.0%	8.8%	21.0%	0.0%	1.6%	3.8%	0.0%	1.3%	2.7%	0.0%	0.9%	2.3%
Schuyler, NY	0.8%	1.8%	1.6%	7.4%	15.6%	0.4%	2.0%	4.2%	-0.0%	0.9%	1.8%	0.4%	1.5%	3.3%
Steuben, NY	0.7%	2.0%	0.4%	6.4%	14.3%	0.1%	2.3%	5.2%	-0.0%	1.4%	2.8%	0.1%	1.3%	3.0%
Tioga, NY	1.2%	2.7%	1.9%	9.1%	19.1%	0.4%	2.0%	4.2%	-0.0%	2.9%	6.0%	0.3%	1.0%	2.1%
Tompkins, NY	0.5%	1.3%	0.0%	4.2%	9.5%	0.0%	2.0%	4.6%	0.0%	2.0%	4.0%	0.0%	0.4%	1.0%
Yates, NY	3.1%	6.5%	0.5%	4.4%	9.6%	0.1%	1.3%	2.9%	0.2%	1.0%	1.9%	0.0%	0.7%	1.8%
Adams, PA	3.4%	11.2%	0.9%	3.4%	5.9%	0.4%	1.3%	2.3%	0.2%	0.6%	1.1%	0.1%	0.3%	0.5%
Bedford, PA	1.9%	3.2%	4.7%	8.5%	13.0%	2.0%	3.7%	5.7%	0.5%	2.0%	3.9%	1.3%	2.1%	3.0%
Berks, PA	0.9%	4.3%	0.5%	2.4%	3.8%	0.3%	1.4%	2.3%	0.1%	0.5%	0.9%	0.1%	0.4%	0.6%
Blair, PA	0.5%	1.4%	2.6%	5.9%	9.4%	2.2%	4.9%	7.9%	1.2%	3.2%	5.1%	0.6%	1.2%	1.8%
Bradford, PA	1.8%	8.1%	2.3%	6.1%	10.5%	0.9%	2.3%	3.9%	0.5%	2.1%	5.0%	0.3%	0.8%	1.3%
Cambria, PA	0.1%	1.5%	4.3%	10.2%	15.0%	1.2%	2.7%	4.0%	0.8%	2.5%	3.9%	1.1%	1.6%	2.1%
Cameron, PA	0.0%	0.0%	profit < 0	profit < 0	profit < 0	0.1%	0.5%	0.8%	n/a	n/a	n/a	n/a	n/a	n/a
Centre, PA	0.4%	0.5%	3.2%	6.3%	9.5%	1.1%	2.1%	3.1%	0.2%	1.4%	2.5%	0.9%	1.5%	2.0%
Chester, PA	0.9%	2.3%	0.2%	1.1%	2.0%	0.1%	0.7%	1.4%	0.0%	0.2%	0.3%	0.1%	0.3%	0.7%
Clearfield, PA	0.1%	0.3%	3.3%	6.7%	9.8%	0.7%	1.5%	2.1%	-0.4%	0.8%	2.4%	1.6%	2.3%	2.7%

Exhibit H2-4. Agriculture Screening Variable Values

County	Percent of Earnings from Agriculture	Percent of Earnings from Agriculture and Related Sectors	Estimated BMP Costs as Percent of NCR (Tier 1)	Estimated BMP Costs as Percent of NCR (Tier 2)	Estimated BMP Costs as Percent of NCR (Tier 3)	Estimated Per-Farm BMP Costs as Percent of County MHI (Tier 1)	Estimated Per-Farm BMP Costs as Percent of County MHI (Tier 2)	Estimated Per-Farm BMP Costs as Percent of County MHI (Tier 3)	Estimated Crop BMP Costs as Percent of Crop Sales (Tier 1)	Estimated Crop BMP Costs as Percent of Crop Sales (Tier 2)	Estimated Crop BMP Costs as Percent of Crop Sales (Tier 3)	Estimated Livestock BMP Costs as Percent of Livestock Sales (Tier 1)	Estimated Livestock BMP Costs as Percent of Livestock Sales (Tier 2)	Estimated Livestock BMP Costs as Percent of Livestock Sales (Tier 3)
Clinton, PA	0.7%	1.0%	5.6%	10.0%	14.9%	1.9%	3.4%	5.0%	0.1%	1.2%	1.9%	1.3%	1.9%	2.8%
Columbia, PA	0.2%	9.2%	7.4%	19.7%	28.5%	0.7%	1.9%	2.8%	0.4%	2.1%	3.1%	1.0%	1.2%	1.6%
Cumberland, PA	0.2%	1.9%	1.7%	3.8%	5.9%	0.7%	1.6%	2.5%	0.8%	2.0%	3.3%	0.3%	0.6%	0.9%
Dauphin, PA	0.1%	0.6%	1.0%	4.4%	7.7%	0.2%	0.9%	1.6%	0.3%	1.3%	2.3%	0.1%	0.3%	0.6%
Elk, PA	0.0%	0.6%	7.9%	27.1%	55.7%	0.3%	1.1%	2.2%	-2.1%	-1.1%	-0.6%	2.1%	4.6%	8.9%
Franklin, PA	1.8%	5.1%	1.7%	4.5%	7.6%	1.3%	3.5%	5.8%	1.6%	3.7%	5.5%	0.2%	0.7%	1.2%
Fulton, PA	0.6%	0.6%	0.5%	5.9%	12.4%	0.1%	1.0%	2.1%	0.5%	1.5%	3.3%	-0.0%	0.7%	1.4%
Huntingdon, PA	2.6%	3.3%	5.8%	13.4%	21.2%	1.2%	2.8%	4.4%	2.0%	4.9%	7.6%	0.5%	1.1%	1.7%
Indiana, PA	0.7%	0.7%	1.4%	4.1%	6.1%	0.6%	1.7%	2.6%	0.1%	1.0%	1.6%	0.6%	0.9%	1.1%
Jefferson, PA	0.7%	0.8%	3.3%	7.6%	12.1%	0.7%	1.6%	2.5%	-0.1%	1.0%	2.1%	1.3%	2.1%	3.0%
Juniata, PA	3.8%	3.8%	2.9%	6.7%	10.8%	0.9%	2.1%	3.4%	1.2%	3.1%	4.9%	0.3%	0.7%	1.1%
Lackawanna, PA	0.1%	1.3%	-1.0%	-0.6%	-0.1%	-0.2%	-0.1%	-0.0%	-0.5%	-0.4%	-0.4%	0.2%	0.2%	0.4%
Lancaster, PA	1.0%	6.2%	0.7%	1.9%	3.0%	0.5%	1.5%	2.3%	0.5%	1.4%	2.2%	0.1%	0.3%	0.4%
Lebanon, PA	0.9%	5.0%	2.1%	4.1%	5.8%	1.6%	3.1%	4.4%	1.0%	3.0%	4.6%	0.3%	0.4%	0.5%
Luzerne, PA	0.1%	1.3%	1.6%	5.5%	8.8%	0.3%	1.0%	1.6%	0.3%	1.4%	2.0%	0.4%	0.9%	1.7%
Lycoming, PA	0.4%	3.0%	2.3%	6.8%	11.0%	0.6%	1.6%	2.7%	0.2%	1.6%	2.7%	0.6%	1.1%	1.6%
Mckean, PA	0.3%	0.9%	51.6%	110.6%	184.1%	1.2%	2.7%	4.4%	1.7%	5.0%	7.2%	2.1%	4.1%	7.2%
Mifflin, PA	1.0%	2.6%	2.8%	5.6%	8.9%	1.7%	3.3%	5.1%	1.0%	2.5%	4.1%	0.6%	1.2%	1.8%
Montour, PA	1.2%	1.2%	-0.4%	1.1%	2.1%	-0.2%	0.6%	1.1%	-0.1%	0.4%	0.7%	-0.1%	-0.0%	0.0%

Exhibit H2-4. Agriculture Screening Variable Values

County	Percent of Earnings from Agriculture	Percent of Earnings from Agriculture and Related Sectors	Estimated BMP Costs as Percent of NCR (Tier 1)	Estimated BMP Costs as Percent of NCR (Tier 2)	Estimated BMP Costs as Percent of NCR (Tier 3)	Estimated Per-Farm BMP Costs as Percent of County MHI (Tier 1)	Estimated Per-Farm BMP Costs as Percent of County MHI (Tier 2)	Estimated Per-Farm BMP Costs as Percent of County MHI (Tier 3)	Estimated Crop BMP Costs as Percent of Crop Sales (Tier 1)	Estimated Crop BMP Costs as Percent of Crop Sales (Tier 2)	Estimated Crop BMP Costs as Percent of Crop Sales (Tier 3)	Estimated Livestock BMP Costs as Percent of Livestock Sales (Tier 1)	Estimated Livestock BMP Costs as Percent of Livestock Sales (Tier 2)	Estimated Livestock BMP Costs as Percent of Livestock Sales (Tier 3)
Northumberland, PA	0.2%	10.0%	1.1%	4.9%	8.1%	0.5%	2.3%	3.7%	0.2%	1.5%	2.4%	0.2%	0.5%	0.8%
Perry, PA	4.4%	5.4%	4.7%	10.0%	15.9%	1.0%	2.2%	3.5%	0.9%	2.2%	3.9%	0.5%	1.1%	1.6%
Potter, PA	2.9%	2.9%	2.1%	6.9%	12.2%	0.8%	2.5%	4.5%	0.2%	1.6%	3.1%	0.4%	1.1%	1.9%
Schuylkill, PA	0.3%	2.7%	2.9%	6.2%	8.7%	1.1%	2.5%	3.5%	0.6%	1.9%	2.8%	0.3%	0.4%	0.4%
Snyder, PA	1.6%	2.8%	4.8%	7.6%	10.6%	2.4%	3.7%	5.2%	1.0%	2.3%	3.8%	0.8%	1.1%	1.5%
Somerset, PA	1.6%	2.8%	0.7%	2.9%	5.0%	0.3%	1.2%	2.2%	-1.3%	0.2%	1.2%	0.4%	0.7%	1.1%
Sullivan, PA	1.6%	1.6%	5.2%	14.5%	24.2%	1.2%	3.3%	5.5%	0.5%	4.1%	9.6%	0.4%	0.9%	1.3%
Susquehanna, PA	3.0%	3.4%	2.1%	5.8%	10.2%	0.7%	1.9%	3.4%	1.6%	3.9%	7.8%	0.3%	0.8%	1.4%
Tioga, PA	2.2%	4.5%	3.3%	5.6%	8.3%	1.4%	2.4%	3.5%	-0.7%	0.4%	1.9%	1.0%	1.5%	2.1%
Union, PA	0.7%	1.0%	1.9%	4.6%	6.9%	0.8%	1.8%	2.7%	0.5%	2.7%	4.1%	0.4%	0.6%	0.9%
Wayne, PA	1.7%	1.7%	3.4%	6.3%	9.5%	0.8%	1.6%	2.3%	0.7%	1.8%	3.7%	0.5%	0.9%	1.3%
Wyoming, PA	1.8%	4.0%	0.1%	1.0%	1.9%	0.1%	0.9%	1.8%	0.2%	1.2%	2.5%	0.0%	0.2%	0.4%
York, PA	0.1%	2.7%	1.9%	8.3%	14.1%	0.4%	1.8%	3.1%	0.6%	2.2%	3.5%	0.0%	0.4%	0.9%
Accomack, VA	3.8%	22.9%	3.2%	4.7%	5.7%	6.1%	8.8%	10.6%	0.9%	1.3%	1.4%	0.0%	0.1%	0.2%
Albemarle, VA	0.2%	0.2%	22.4%	37.5%	52.8%	1.1%	1.9%	2.6%	-0.1%	0.4%	0.9%	2.5%	3.9%	5.5%
Alleghany, VA	0.1%	0.1%	profit < 0	profit < 0	profit < 0	0.4%	3.7%	9.2%	0.5%	3.6%	6.1%	1.2%	11.8%	30.0%
Amelia, VA	10.3%	10.3%	2.2%	3.9%	5.4%	1.5%	2.7%	3.7%	0.1%	0.7%	0.7%	0.4%	0.6%	0.9%
Amherst, VA	0.3%	0.3%	profit < 0	profit < 0	profit < 0	0.5%	2.7%	6.0%	0.0%	0.9%	1.7%	1.8%	10.5%	23.1%
Appomattox, VA	-0.2%	1.3%	5.4%	25.9%	54.0%	0.7%	3.4%	7.1%	-0.1%	0.8%	1.5%	1.8%	7.9%	16.5%

Exhibit H2-4. Agriculture Screening Variable Values

County	Percent of Earnings from Agriculture	Percent of Earnings from Agriculture and Related Sectors	Estimated BMP Costs as Percent of NCR (Tier 1)	Estimated BMP Costs as Percent of NCR (Tier 2)	Estimated BMP Costs as Percent of NCR (Tier 3)	Estimated Per-Farm BMP Costs as Percent of County MHI (Tier 1)	Estimated Per-Farm BMP Costs as Percent of County MHI (Tier 2)	Estimated Per-Farm BMP Costs as Percent of County MHI (Tier 3)	Estimated Crop BMP Costs as Percent of Crop Sales (Tier 1)	Estimated Crop BMP Costs as Percent of Crop Sales (Tier 2)	Estimated Crop BMP Costs as Percent of Crop Sales (Tier 3)	Estimated Livestock BMP Costs as Percent of Livestock Sales (Tier 1)	Estimated Livestock BMP Costs as Percent of Livestock Sales (Tier 2)	Estimated Livestock BMP Costs as Percent of Livestock Sales (Tier 3)
Arlington City, VA	0.0%	0.0%	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Augusta, VA	1.1%	1.1%	4.3%	10.1%	16.8%	1.1%	2.5%	4.1%	0.1%	0.8%	1.4%	0.5%	1.2%	2.0%
Bath, VA	0.2%	0.7%	profit < 0	profit < 0	profit < 0	1.3%	8.5%	20.4%	0.9%	5.1%	7.9%	3.5%	22.8%	55.7%
Bedford, VA	0.1%	0.1%	11.4%	57.0%	135.7%	0.4%	2.0%	4.8%	-1.0%	-0.7%	-0.6%	1.3%	5.7%	13.5%
Botetourt, VA	0.7%	0.7%	7.4%	10.4%	11.6%	0.4%	0.5%	0.6%	2.0%	2.7%	3.0%	0.6%	0.8%	0.9%
Buckingham, VA	2.7%	2.7%	3.6%	14.8%	31.9%	0.8%	3.2%	6.9%	-0.8%	-0.1%	0.4%	0.6%	2.2%	4.7%
Campbell, VA	0.0%	0.4%	7.1%	21.2%	43.6%	1.0%	3.0%	6.1%	1.5%	2.4%	2.9%	1.4%	5.9%	13.5%
Caroline, VA	1.0%	1.0%	4.7%	9.6%	13.5%	2.1%	4.3%	6.0%	0.9%	1.8%	2.2%	1.6%	3.4%	6.8%
Charles City, VA	1.1%	1.1%	1.3%	-3.0%	-5.8%	-0.8%	1.8%	3.5%	0.1%	-0.4%	-0.6%	0.4%	-0.9%	-2.9%
Chesterfield, VA	0.1%	1.0%	3.2%	5.9%	10.6%	0.8%	1.5%	2.7%	0.6%	0.8%	0.9%	1.0%	2.3%	4.9%
Clarke, VA	0.6%	3.1%	profit < 0	profit < 0	profit < 0	3.1%	5.1%	5.7%	0.6%	2.2%	3.2%	6.3%	9.6%	10.4%
Craig, VA	2.5%	2.5%	128.1%	279.1%	549.0%	2.1%	4.6%	9.0%	2.4%	4.0%	4.5%	5.6%	12.4%	24.7%
Culpeper, VA	0.8%	2.2%	60.2%	137.5%	231.9%	0.9%	2.1%	3.5%	0.5%	0.9%	1.1%	1.4%	3.4%	6.0%
Cumberland, VA	8.7%	8.7%	2.7%	7.4%	14.0%	1.3%	3.6%	6.9%	0.0%	0.5%	0.7%	0.4%	1.1%	2.1%
Dinwiddie, VA	0.1%	0.1%	0.7%	7.7%	16.3%	0.2%	2.6%	5.4%	0.2%	1.2%	2.0%	0.1%	3.4%	9.0%
Essex, VA	1.0%	1.0%	13.7%	27.9%	40.4%	4.7%	9.7%	14.0%	1.1%	1.8%	2.1%	3.7%	14.6%	32.5%
Fairfax, VA	0.0%	0.7%	-0.8%	-0.4%	-0.2%	-0.6%	-0.3%	-0.2%	-0.3%	-0.2%	-0.2%	-0.2%	-0.0%	0.2%
Fauquier, VA	0.9%	1.0%	5.4%	13.9%	25.2%	0.8%	2.0%	3.7%	1.0%	2.0%	2.5%	1.1%	3.0%	5.8%
Fluvanna, VA	0.9%	1.8%	2.7%	20.0%	46.1%	0.3%	2.3%	5.3%	-0.0%	1.0%	1.9%	0.6%	4.3%	10.0%

Exhibit H2-4. Agriculture Screening Variable Values

County	Percent of Earnings from Agriculture	Percent of Earnings from Agriculture and Related Sectors	Estimated BMP Costs as Percent of NCR (Tier 1)	Estimated BMP Costs as Percent of NCR (Tier 2)	Estimated BMP Costs as Percent of NCR (Tier 3)	Estimated Per-Farm BMP Costs as Percent of County MHI (Tier 1)	Estimated Per-Farm BMP Costs as Percent of County MHI (Tier 2)	Estimated Per-Farm BMP Costs as Percent of County MHI (Tier 3)	Estimated Crop BMP Costs as Percent of Crop Sales (Tier 1)	Estimated Crop BMP Costs as Percent of Crop Sales (Tier 2)	Estimated Crop BMP Costs as Percent of Crop Sales (Tier 3)	Estimated Livestock BMP Costs as Percent of Livestock Sales (Tier 1)	Estimated Livestock BMP Costs as Percent of Livestock Sales (Tier 2)	Estimated Livestock BMP Costs as Percent of Livestock Sales (Tier 3)
Frederick, VA	0.4%	4.0%	11.3%	28.5%	47.0%	0.8%	2.0%	3.4%	0.1%	0.7%	1.3%	3.3%	7.3%	12.0%
Giles, VA	-0.4%	-0.4%	-1.8%	31.2%	92.3%	-0.1%	2.1%	6.2%	-0.2%	0.5%	0.9%	-0.4%	7.0%	20.7%
Gloucester, VA	0.0%	2.0%	4.9%	11.1%	15.8%	1.3%	2.9%	4.2%	0.9%	2.0%	2.5%	0.6%	4.4%	11.7%
Goochland, VA	0.2%	2.0%	6.0%	18.2%	36.3%	0.5%	1.4%	2.8%	-0.3%	0.2%	0.5%	1.2%	3.1%	6.2%
Greene, VA	0.3%	0.3%	29.9%	122.9%	269.0%	0.5%	2.2%	4.8%	-1.1%	-0.8%	-0.6%	1.1%	4.3%	9.3%
Hanover, VA	0.3%	0.3%	3.5%	6.7%	9.9%	1.1%	2.2%	3.2%	0.9%	1.5%	1.7%	1.1%	2.8%	5.7%
Henrico, VA	0.1%	1.2%	0.6%	1.6%	2.7%	0.3%	0.8%	1.4%	0.3%	0.6%	0.8%	0.3%	0.9%	1.8%
Highland, VA	9.9%	9.9%	28.5%	115.8%	266.6%	1.8%	7.4%	17.1%	0.2%	2.5%	3.5%	1.2%	4.7%	10.8%
Isle Of Wight, VA	0.5%	1.2%	1.6%	6.2%	10.8%	1.9%	7.5%	13.1%	0.4%	1.1%	1.4%	-0.0%	0.5%	1.4%
James City, VA	0.0%	0.0%	-3.6%	0.2%	5.8%	-0.7%	0.0%	1.1%	-1.3%	-0.9%	-0.8%	0.3%	3.9%	10.9%
King And Queen, VA	-0.4%	-0.4%	1.1%	10.9%	16.2%	0.4%	4.1%	6.0%	0.2%	1.4%	1.8%	-0.1%	0.6%	2.1%
King George, VA	0.1%	0.1%	4.0%	9.0%	11.4%	0.4%	0.9%	1.2%	0.6%	1.3%	1.4%	0.4%	1.6%	4.0%
King William, VA	0.9%	0.9%	7.2%	13.9%	17.0%	1.7%	3.2%	4.0%	0.9%	1.9%	2.2%	0.3%	0.3%	0.5%
Lancaster, VA	0.1%	3.6%	8.0%	17.7%	23.9%	1.7%	3.7%	5.0%	0.9%	2.0%	2.7%	-1.8%	-1.6%	-1.1%
Loudoun, VA	0.1%	0.1%	9.1%	46.6%	94.1%	0.2%	0.8%	1.6%	-1.1%	-0.6%	-0.4%	1.8%	5.6%	10.7%
Louisa, VA	-0.2%	-0.2%	11.1%	20.1%	33.2%	1.5%	2.7%	4.5%	1.5%	3.0%	3.9%	2.4%	4.3%	7.5%
Madison, VA	0.4%	2.5%	8.7%	36.5%	72.2%	0.8%	3.5%	6.9%	0.7%	3.9%	6.3%	0.8%	3.2%	6.6%
Mathews, VA	1.6%	1.6%	3.8%	23.9%	50.6%	0.7%	4.6%	9.7%	0.3%	1.3%	2.0%	0.5%	15.9%	46.2%
Middlesex, VA	0.6%	2.6%	0.8%	4.3%	7.3%	0.8%	4.0%	6.8%	0.2%	0.7%	1.0%	-2.1%	0.6%	6.2%

Exhibit H2-4. Agriculture Screening Variable Values

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Montgomery, VA	0.1%	0.1%	6.9%	17.1%	35.6%	1.5%	3.6%	7.6%	0.5%	0.7%	0.9%	1.8%	4.4%	9.3%
Nelson, VA	2.5%	2.5%	780.4%	3377.3%	7460.9%	0.7%	2.9%	6.4%	0.4%	1.3%	2.0%	2.5%	11.2%	26.0%
New Kent, VA	0.0%	2.1%	-3.6%	4.0%	9.4%	-0.5%	0.6%	1.4%	-0.4%	0.5%	1.0%	-1.1%	1.2%	6.4%
Northampton, VA	7.0%	7.9%	0.5%	1.6%	2.4%	2.6%	7.8%	11.7%	0.3%	0.7%	1.0%	0.0%	0.1%	0.5%
Northumberland, VA	1.5%	19.6%	-0.7%	0.8%	1.2%	-0.7%	0.7%	1.1%	-0.2%	0.2%	0.4%	-1.5%	-1.4%	-1.2%
Nottoway, VA	1.9%	1.9%	2.7%	11.3%	22.7%	1.0%	4.2%	8.4%	-0.0%	0.4%	0.8%	0.5%	1.9%	3.8%
Orange, VA	2.0%	2.9%	3.7%	9.4%	18.0%	1.1%	2.9%	5.5%	0.4%	0.8%	0.9%	1.1%	3.1%	6.3%
Page, VA	7.2%	9.7%	2.8%	3.9%	5.3%	1.7%	2.4%	3.2%	0.2%	0.9%	1.3%	0.3%	0.4%	0.5%
Powhatan, VA	0.8%	0.8%	10.0%	21.6%	36.1%	0.8%	1.8%	2.9%	0.7%	1.3%	1.5%	1.6%	3.6%	6.1%
Prince Edward, VA	1.1%	1.1%	17.0%	35.6%	58.2%	2.9%	6.0%	9.8%	-0.5%	-0.2%	0.1%	2.1%	4.3%	7.0%
Prince George, VA	-0.0%	0.1%	2.1%	4.3%	5.5%	0.5%	1.1%	1.4%	0.6%	1.0%	1.2%	-0.9%	-0.5%	0.2%
Prince William, VA	0.0%	0.1%	3.7%	5.2%	7.4%	0.5%	0.6%	0.9%	0.3%	0.3%	0.2%	1.2%	1.8%	2.8%
Rappahannock, VA	0.1%	3.0%	profit < 0	profit < 0	profit < 0	0.4%	1.5%	3.1%	0.6%	1.5%	2.2%	1.7%	6.7%	14.1%
Richmond, VA	1.7%	1.7%	3.5%	6.0%	8.0%	1.8%	3.1%	4.1%	0.7%	1.1%	1.2%	2.5%	6.6%	13.0%
Roanoke, VA	0.0%	0.0%	0.2%	16.8%	43.4%	0.0%	0.8%	2.1%	0.0%	0.5%	0.9%	0.0%	3.7%	9.8%
Rockbridge, VA	0.3%	0.3%	15.7%	65.8%	151.9%	1.0%	4.4%	10.2%	0.1%	1.2%	2.1%	1.6%	6.7%	15.5%
Rockingham, VA	2.9%	13.9%	2.6%	3.7%	4.7%	2.2%	3.1%	4.0%	1.1%	1.9%	2.2%	0.3%	0.5%	0.6%
Shenandoah, VA	3.0%	10.5%	9.8%	17.5%	25.7%	1.6%	2.9%	4.2%	0.9%	1.6%	1.9%	0.7%	1.2%	1.9%
Spotsylvania, VA	-0.0%	-0.0%	-0.2%	28.1%	57.4%	-0.0%	0.6%	1.3%	-1.3%	-0.4%	-0.3%	0.7%	2.4%	4.5%

Exhibit H2-4. Agriculture Screening Variable Values

County	Percent of Earnings from Agriculture	Percent of Earnings from Agriculture and Related Sectors	Estimated BMP Costs as Percent of NCR (Tier 1)	Estimated BMP Costs as Percent of NCR (Tier 2)	Estimated BMP Costs as Percent of NCR (Tier 3)	Estimated Per-Farm BMP Costs as Percent of County MHI (Tier 1)	Estimated Per-Farm BMP Costs as Percent of County MHI (Tier 2)	Estimated Per-Farm BMP Costs as Percent of County MHI (Tier 3)	Estimated Crop BMP Costs as Percent of Crop Sales (Tier 1)	Estimated Crop BMP Costs as Percent of Crop Sales (Tier 2)	Estimated Crop BMP Costs as Percent of Crop Sales (Tier 3)	Estimated Livestock BMP Costs as Percent of Livestock Sales (Tier 1)	Estimated Livestock BMP Costs as Percent of Livestock Sales (Tier 2)	Estimated Livestock BMP Costs as Percent of Livestock Sales (Tier 3)
Stafford, VA	-0.0%	-0.0%	-20.6%	-1.6%	12.8%	-0.3%	-0.0%	0.2%	-1.6%	-0.9%	-0.8%	-0.3%	1.2%	2.9%
Surry, VA	0.9%	0.9%	7.2%	23.1%	38.5%	2.8%	8.9%	14.8%	1.0%	2.3%	2.9%	0.0%	0.8%	2.1%
Warren, VA	0.1%	1.2%	254.9%	942.2%	1794.5%	0.5%	1.9%	3.6%	0.2%	2.1%	3.9%	1.4%	5.1%	9.7%
Westmoreland, VA	3.5%	3.5%	6.6%	10.9%	16.0%	4.1%	6.8%	10.0%	0.9%	1.2%	1.3%	2.7%	8.8%	18.9%
York, VA	0.1%	0.1%	-0.4%	-0.3%	-0.0%	-1.2%	-1.0%	-0.1%	n/a	n/a	n/a	n/a	n/a	n/a
Alexandria City, VA	0.0%	0.0%	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Buena Vista City, VA	0.3%	0.3%	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Charlottesville City, VA	0.2%	0.2%	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Chesapeake City, VA	0.2%	0.2%	0.2%	3.6%	7.1%	0.2%	3.8%	7.5%	0.0%	0.9%	1.7%	0.0%	1.3%	3.7%
Clifton Forge City, VA	0.1%	0.1%	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Colonial Heights City, VA	0.1%	0.1%	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Covington City, VA	0.1%	0.1%	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Fairfax City, VA	0.0%	0.7%	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Falls Church City, VA	0.0%	0.7%	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Fredericksburg City, VA	-0.0%	-0.0%	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Hampton City, VA	0.0%	0.1%	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

Exhibit H2-4. Agriculture Screening Variable Values

County	Percent of Earnings from Agriculture	Percent of Earnings from Agriculture and Related Sectors	Estimated BMP Costs as Percent of NCR (Tier 1)	Estimated BMP Costs as Percent of NCR (Tier 2)	Estimated BMP Costs as Percent of NCR (Tier 3)	Estimated Per-Farm BMP Costs as Percent of County MHI (Tier 1)	Estimated Per-Farm BMP Costs as Percent of County MHI (Tier 2)	Estimated Per-Farm BMP Costs as Percent of County MHI (Tier 3)	Estimated Crop BMP Costs as Percent of Crop Sales (Tier 1)	Estimated Crop BMP Costs as Percent of Crop Sales (Tier 2)	Estimated Crop BMP Costs as Percent of Crop Sales (Tier 3)	Estimated Livestock BMP Costs as Percent of Livestock Sales (Tier 1)	Estimated Livestock BMP Costs as Percent of Livestock Sales (Tier 2)	Estimated Livestock BMP Costs as Percent of Livestock Sales (Tier 3)
Harrisonburg City, VA	2.9%	13.9%	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Hopewell City, VA	-0.0%	0.1%	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Lexington City, VA	0.3%	0.3%	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Lynchburg City, VA	0.0%	0.4%	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Manassas City, VA	0.0%	0.1%	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Manassas Park City, VA	0.0%	0.1%	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Newport News City, VA	0.0%	1.0%	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Norfolk City, VA	0.0%	0.3%	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Petersburg City, VA	0.1%	0.1%	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Poquoson City, VA	0.1%	0.1%	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Portsmouth City, VA	0.0%	1.5%	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Richmond City, VA	0.0%	0.5%	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Staunton City, VA	1.1%	1.1%	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Suffolk, VA	0.7%	6.8%	3.0%	9.7%	16.6%	3.4%	11.3%	19.3%	0.3%	1.0%	1.4%	0.4%	1.5%	3.6%
Virginia Beach, VA	0.0%	0.8%	-2.2%	-1.6%	-0.7%	-2.0%	-1.4%	-0.6%	-0.9%	-0.9%	-0.9%	0.1%	0.9%	2.1%
Waynesboro City, VA	1.1%	1.1%	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

Exhibit H2-4. Agriculture Screening Variable Values

County	Percent of Earnings from Agriculture	Percent of Earnings from Agriculture and Related Sectors	Estimated BMP Costs as Percent of NCR (Tier 1)	Estimated BMP Costs as Percent of NCR (Tier 2)	Estimated BMP Costs as Percent of NCR (Tier 3)	Estimated Per-Farm BMP Costs as Percent of County MHI (Tier 1)	Estimated Per-Farm BMP Costs as Percent of County MHI (Tier 2)	Estimated Per-Farm BMP Costs as Percent of County MHI (Tier 3)	Estimated Crop BMP Costs as Percent of Crop Sales (Tier 1)	Estimated Crop BMP Costs as Percent of Crop Sales (Tier 2)	Estimated Crop BMP Costs as Percent of Crop Sales (Tier 3)	Estimated Livestock BMP Costs as Percent of Livestock Sales (Tier 1)	Estimated Livestock BMP Costs as Percent of Livestock Sales (Tier 2)	Estimated Livestock BMP Costs as Percent of Livestock Sales (Tier 3)
Williamsburg City, VA	0.0%	0.0%	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Winchester City, VA	0.4%	4.0%	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Berkeley, WV	0.4%	1.9%	9.2%	15.0%	24.3%	0.9%	1.5%	2.4%	0.6%	0.7%	0.8%	2.1%	3.9%	6.9%
Grant, WV	1.4%	1.4%	7.6%	18.0%	37.2%	3.4%	8.1%	16.8%	3.3%	5.3%	6.3%	1.2%	2.8%	5.9%
Hampshire, WV	2.2%	3.5%	20.7%	43.9%	87.5%	1.9%	4.0%	8.0%	0.1%	0.2%	0.3%	2.7%	5.7%	11.3%
Hardy, WV	2.3%	2.3%	3.2%	6.9%	13.7%	2.9%	6.1%	12.1%	1.1%	1.7%	2.1%	0.4%	0.8%	1.6%
Jefferson, WV	0.5%	1.6%	6.5%	11.8%	19.8%	1.1%	2.1%	3.5%	0.5%	0.9%	1.1%	1.3%	2.4%	4.3%
Mineral, WV	0.3%	0.7%	11.6%	24.0%	46.8%	1.5%	3.0%	5.9%	3.4%	4.9%	5.7%	2.1%	4.5%	9.2%
Monroe, WV	-2.2%	-2.2%	9.7%	22.9%	48.6%	1.7%	3.9%	8.3%	-0.7%	-0.7%	-0.6%	1.6%	3.8%	7.9%
Morgan, WV	-0.2%	-0.2%	profit < 0	profit < 0	profit < 0	0.7%	1.4%	2.5%	2.2%	3.2%	3.8%	7.3%	16.0%	30.5%
Pendleton, WV	8.8%	8.8%	7.8%	17.3%	34.9%	2.5%	5.6%	11.3%	2.5%	3.8%	4.5%	0.7%	1.6%	3.2%

Source: October 30, 2002 model output.
n/a = Not applicable.
Note: profit < 0 = NCR plus government payments is negative. Costs (see Appendix E for documentation) and MHI are in 2001 $.

Exhibit H2-5. Urban Screening Variable Values

County	Estimated Urban and Mixed Open BMP Costs (Tier 1)	Estimated Urban and Mixed Open BMP Costs (Tier 2)	Estimated Urban and Mixed Open BMP Costs (Tier 3)	Estimated Urban Households in Watershed (2010)	County MHI from 2000 Census	Estimated BMP Costs per Urban Household as Percent of County MHI (Tier 1)	Estimated BMP Costs per Urban Household as Percent of County MHI (Tier 2)	Estimated BMP Costs per Urban Household as Percent of County MHI (Tier 3)
Kent, DE	256,354	77,054	256,354	5,176	43,531	0.0%	0.1%	0.1%
New Castle, DE	240,649	16,265	240,649	1,303	55,723	0.0%	0.1%	0.3%
Sussex, DE	1,892,455	390,058	1,892,455	12,316	41,679	0.1%	0.2%	0.4%
Washington, DC	8,346,901	334,198	8,346,901	250,451	42,656	0.0%	0.0%	0.1%
Allegany, MD	2,572,116	334,503	2,572,116	22,684	32,764	0.0%	0.1%	0.3%
Anne Arundel, MD	13,605,869	1,914,940	13,605,869	176,044	65,661	0.0%	0.0%	0.1%
Baltimore, MD	13,888,217	1,800,358	13,888,217	275,563	53,860	0.0%	0.0%	0.1%
Calvert, MD	4,131,267	978,302	4,131,267	17,831	70,101	0.1%	0.1%	0.3%
Caroline, MD	1,077,073	368,655	1,077,073	2,623	41,279	0.3%	0.5%	1.0%
Carroll, MD	2,820,634	1,692,903	2,820,634	34,855	63,804	0.1%	0.1%	0.1%
Cecil, MD	2,709,149	796,844	2,709,149	15,234	53,693	0.1%	0.2%	0.3%
Charles, MD	6,148,433	1,363,716	6,148,433	34,780	66,119	0.1%	0.1%	0.3%
Dorchester, MD	1,201,413	140,248	1,201,413	5,317	36,225	0.1%	0.2%	0.6%
Frederick, MD	4,798,725	1,613,011	4,798,725	62,739	64,075	0.0%	0.1%	0.1%
Garrett, MD	483,978	24,791	483,978	353	34,270	0.2%	1.1%	4.0%
Harford, MD	5,397,812	1,293,931	5,397,812	69,904	60,841	0.0%	0.1%	0.1%
Howard, MD	6,333,771	2,393,265	6,333,771	91,673	78,841	0.0%	0.0%	0.1%
Kent, MD	553,878	134,394	553,878	2,048	42,382	0.2%	0.3%	0.6%
Montgomery, MD	13,644,491	2,282,954	13,644,491	341,190	76,061	0.0%	0.0%	0.1%
Prince Georges, MD	16,914,555	2,705,454	16,914,555	307,724	58,739	0.0%	0.0%	0.1%
Queen Annes, MD	1,633,483	404,404	1,633,483	7,058	60,632	0.1%	0.2%	0.4%
St Marys, MD	4,523,666	1,295,980	4,523,666	13,662	58,154	0.2%	0.3%	0.6%
Somerset, MD	860,810	93,736	860,810	4,383	31,788	0.1%	0.2%	0.6%
Talbot, MD	1,597,658	187,366	1,597,658	5,501	46,276	0.1%	0.2%	0.6%
Washington, MD	3,727,758	975,980	3,727,758	35,352	43,177	0.1%	0.1%	0.2%
Wicomico, MD	2,714,455	629,191	2,714,455	24,096	41,495	0.1%	0.1%	0.3%
Worcester, MD	398,810	57,872	398,810	4,889	43,212	0.0%	0.1%	0.2%
Baltimore City, MD	7,802,340	317,550	7,802,340	266,454	31,974	0.0%	0.0%	0.1%
Allegany, NY	348,041	28,724	348,041	580	34,129	0.1%	0.5%	1.8%
Broome, NY	5,590,172	237,604	5,590,172	59,404	37,575	0.0%	0.1%	0.3%
Chemung, NY	2,494,408	107,253	2,494,408	26,195	38,710	0.0%	0.1%	0.2%
Chenango, NY	1,823,800	319,331	1,823,800	3,801	35,802	0.2%	0.5%	1.3%
Cortland, NY	979,928	117,722	979,928	10,176	36,530	0.0%	0.1%	0.3%
Delaware, NY	561,923	23,665	561,923	867	34,507	0.1%	0.5%	1.9%
Herkimer, NY	225,635	24,729	225,635	853	34,999	0.1%	0.2%	0.8%
Livingston, NY	758	0	758	53	44,717	0.0%	0.0%	0.0%
Madison, NY	308,740	45,696	308,740	3,220	42,717	0.0%	0.1%	0.2%

Exhibit H2-5. Urban Screening Variable Values

County	Estimated Urban and Mixed Open BMP Costs (Tier 1)	Estimated Urban and Mixed Open BMP Costs (Tier 2)	Estimated Urban and Mixed Open BMP Costs (Tier 3)	Estimated Urban Households in Watershed (2010)	County MHI from 2000 Census	Estimated BMP Costs per Urban Household as Percent of County MHI (Tier 1)	Estimated BMP Costs per Urban Household as Percent of County MHI (Tier 2)	Estimated BMP Costs per Urban Household as Percent of County MHI (Tier 3)
Oneida, NY	48,346	2,876	48,346	624	38,172	0.0%	0.1%	0.2%
Onondaga, NY	89,285	3,916	89,285	979	43,421	0.0%	0.1%	0.2%
Ontario, NY	36	0	36	19	47,389	0.0%	0.0%	0.0%
Otsego, NY	1,800,971	125,667	1,800,971	6,214	35,552	0.1%	0.2%	0.8%
Schoharie, NY	29,930	1,241	29,930	79	38,891	0.0%	0.3%	1.0%
Schuyler, NY	282,047	11,875	282,047	389	38,280	0.1%	0.5%	1.9%
Steuben, NY	4,815,684	470,366	4,815,684	13,960	37,715	0.1%	0.3%	0.9%
Tioga, NY	2,085,022	148,008	2,085,022	6,966	42,804	0.0%	0.2%	0.7%
Tompkins, NY	91,600	12,387	91,600	667	39,621	0.0%	0.1%	0.3%
Yates, NY	5,493	794	5,493	31	36,823	0.1%	0.2%	0.5%
Adams, PA	1,852,277	249,248	1,852,277	14,138	45,395	0.0%	0.1%	0.3%
Bedford, PA	1,304,315	200,032	1,304,315	3,211	34,794	0.2%	0.4%	1.2%
Berks, PA	314,117	18,066	314,117	3,345	47,532	0.0%	0.1%	0.2%
Blair, PA	2,796,790	315,217	2,796,790	40,914	34,932	0.0%	0.1%	0.2%
Bradford, PA	1,975,792	187,670	1,975,792	6,642	37,246	0.1%	0.2%	0.8%
Cambria, PA	989,369	57,212	989,369	8,898	32,081	0.0%	0.1%	0.3%
Cameron, PA	314,283	50,219	314,283	1,246	34,242	0.1%	0.3%	0.7%
Centre, PA	3,319,853	500,952	3,319,853	33,239	38,444	0.0%	0.1%	0.3%
Chester, PA	482,341	38,972	482,341	10,227	69,410	0.0%	0.0%	0.1%
Clearfield, PA	5,488,637	261,710	5,488,637	10,376	33,333	0.1%	0.4%	1.6%
Clinton, PA	1,733,356	261,264	1,733,356	7,551	33,022	0.1%	0.2%	0.7%
Columbia, PA	1,548,231	127,432	1,548,231	13,977	36,243	0.0%	0.1%	0.3%
Cumberland, PA	4,734,451	429,681	4,734,451	64,378	49,651	0.0%	0.0%	0.1%
Dauphin, PA	5,138,238	286,431	5,138,238	85,051	44,123	0.0%	0.0%	0.1%
Elk, PA	318,935	50,434	318,935	1,120	39,917	0.1%	0.3%	0.7%
Franklin, PA	3,611,191	303,560	3,611,191	27,515	43,027	0.0%	0.1%	0.3%
Fulton, PA	350,172	40,788	350,172	0	37,080	n/a	n/a	n/a
Huntingdon, PA	740,815	110,734	740,815	5,318	35,413	0.1%	0.1%	0.4%
Indiana, PA	392,908	21,618	392,908	603	32,138	0.1%	0.6%	2.0%
Jefferson, PA	90,446	3,910	90,446	0	33,721	n/a	n/a	n/a
Juniata, PA	320,721	70,194	320,721	1,265	36,885	0.2%	0.3%	0.7%
Lackawanna, PA	6,404,128	298,139	6,404,128	66,460	36,608	0.0%	0.1%	0.3%
Lancaster, PA	9,115,706	1,610,644	9,115,706	142,899	48,375	0.0%	0.0%	0.1%
Lebanon, PA	2,359,202	163,159	2,359,202	28,486	43,412	0.0%	0.1%	0.2%
Luzerne, PA	8,004,554	385,723	8,004,554	91,593	35,899	0.0%	0.1%	0.2%
Lycoming, PA	2,714,053	459,226	2,714,053	32,226	36,160	0.0%	0.1%	0.2%
Mckean, PA	7,358	2,502	7,358	7	35,122	1.0%	1.5%	3.0%

Exhibit H2-5. Urban Screening Variable Values

County	Estimated Urban and Mixed Open BMP Costs (Tier 1)	Estimated Urban and Mixed Open BMP Costs (Tier 2)	Estimated Urban and Mixed Open BMP Costs (Tier 3)	Estimated Urban Households in Watershed (2010)	County MHI from 2000 Census	Estimated BMP Costs per Urban Household as Percent of County MHI (Tier 1)	Estimated BMP Costs per Urban Household as Percent of County MHI (Tier 2)	Estimated BMP Costs per Urban Household as Percent of County MHI (Tier 3)
Mifflin, PA	951,916	163,496	951,916	8,755	34,203	0.1%	0.1%	0.3%
Montour, PA	741,362	70,298	741,362	3,284	40,475	0.1%	0.2%	0.6%
Northumberland, PA	2,503,923	149,473	2,503,923	24,009	33,288	0.0%	0.1%	0.3%
Perry, PA	777,556	213,277	777,556	2,647	44,550	0.2%	0.3%	0.7%
Potter, PA	290,255	46,538	290,255	0	34,286	n/a	n/a	n/a
Schuylkill, PA	2,781,311	132,971	2,781,311	15,177	34,760	0.0%	0.1%	0.5%
Snyder, PA	576,995	123,326	576,995	4,365	38,249	0.1%	0.1%	0.3%
Somerset, PA	104,803	20,571	104,803	231	32,859	0.3%	0.5%	1.4%
Sullivan, PA	363,090	44,185	363,090	0	32,187	n/a	n/a	n/a
Susquehanna, PA	1,380,453	245,525	1,380,453	3,218	35,741	0.2%	0.5%	1.2%
Tioga, PA	2,029,496	346,988	2,029,496	2,686	34,038	0.4%	0.8%	2.2%
Union, PA	748,809	58,071	748,809	7,270	42,878	0.0%	0.1%	0.2%
Wayne, PA	147,086	10,168	147,086	86	36,230	0.3%	1.3%	4.7%
Wyoming, PA	2,149,174	303,066	2,149,174	1,769	38,657	0.4%	1.1%	3.1%
York, PA	5,731,443	385,264	5,731,443	106,586	48,121	0.0%	0.0%	0.1%
Accomack, VA	560,947	34,403	560,947	813	32,157	0.1%	0.6%	2.1%
Albemarle, VA	3,454,077	330,271	3,454,077	17,236	53,947	0.0%	0.1%	0.4%
Alleghany, VA	916,630	40,998	916,630	1,255	40,974	0.1%	0.5%	1.8%
Amelia, VA	435,195	17,489	435,195	0	42,789	n/a	n/a	n/a
Amherst, VA	1,917,220	84,220	1,917,220	4,109	39,750	0.1%	0.3%	1.2%
Appomattox, VA	590,940	75,789	590,940	0	38,808	n/a	n/a	n/a
Arlington City, VA	3,541,547	145,177	3,541,547	83,402	66,972	0.0%	0.0%	0.1%
Augusta, VA	3,631,491	197,662	3,631,491	5,075	45,758	0.1%	0.4%	1.6%
Bath, VA	590,026	26,641	590,026	0	37,220	n/a	n/a	n/a
Bedford, VA	1,355,614	125,896	1,355,614	800	45,855	0.3%	1.1%	3.7%
Botetourt, VA	1,608,395	109,202	1,608,395	1,772	51,802	0.1%	0.5%	1.8%
Buckingham, VA	863,383	37,231	863,383	0	31,765	n/a	n/a	n/a
Campbell, VA	908,999	85,952	908,999	2,374	39,630	0.1%	0.3%	1.0%
Caroline, VA	1,278,670	72,069	1,278,670	0	42,356	n/a	n/a	n/a
Charles City, VA	154,266	6,697	154,266	0	45,439	n/a	n/a	n/a
Chesterfield, VA	8,770,129	2,594,103	8,770,129	101,740	62,226	0.0%	0.1%	0.1%
Clarke, VA	246,345	90,409	246,345	1,487	54,853	0.1%	0.2%	0.3%
Craig, VA	106,521	4,674	106,521	0	39,666	n/a	n/a	n/a
Culpeper, VA	1,873,204	464,394	1,873,204	4,047	48,144	0.2%	0.4%	1.0%
Cumberland, VA	489,012	20,629	489,012	125	33,821	0.5%	3.1%	11.6%
Dinwiddie, VA	700,437	38,427	700,437	870	44,203	0.1%	0.5%	1.8%
Essex, VA	311,150	13,398	311,150	692	39,752	0.0%	0.3%	1.1%

Exhibit H2-5. Urban Screening Variable Values

County	Estimated Urban and Mixed Open BMP Costs (Tier 1)	Estimated Urban and Mixed Open BMP Costs (Tier 2)	Estimated Urban and Mixed Open BMP Costs (Tier 3)	Estimated Urban Households in Watershed (2010)	County MHI from 2000 Census	Estimated BMP Costs per Urban Household as Percent of County MHI (Tier 1)	Estimated BMP Costs per Urban Household as Percent of County MHI (Tier 2)	Estimated BMP Costs per Urban Household as Percent of County MHI (Tier 3)
Fairfax, VA	19,624,625	2,761,908	19,624,625	380,757	86,158	0.0%	0.0%	0.1%
Fauquier, VA	4,658,191	1,889,117	4,658,191	7,206	65,907	0.4%	0.6%	1.0%
Fluvanna, VA	1,313,445	58,921	1,313,445	1,775	49,295	0.1%	0.4%	1.5%
Frederick, VA	1,647,925	236,394	1,647,925	12,284	49,899	0.0%	0.1%	0.3%
Giles, VA	3	0	3	9	37,128	0.0%	0.0%	0.0%
Gloucester, VA	1,676,879	650,007	1,676,879	4,863	48,284	0.3%	0.4%	0.7%
Goochland, VA	994,181	242,937	994,181	384	59,856	1.1%	1.9%	4.3%
Greene, VA	697,086	62,082	697,086	0	48,826	n/a	n/a	n/a
Hanover, VA	3,892,359	576,395	3,892,359	19,071	62,956	0.0%	0.1%	0.3%
Henrico, VA	7,685,247	813,019	7,685,247	106,102	52,285	0.0%	0.0%	0.1%
Highland, VA	201,525	8,394	201,525	0	31,606	n/a	n/a	n/a
Isle Of Wight, VA	1,469,286	206,474	1,469,286	3,202	48,248	0.1%	0.3%	1.0%
James City, VA	2,141,520	407,361	2,141,520	15,113	59,098	0.0%	0.1%	0.2%
King And Queen, VA	197,721	17,098	197,721	0	38,206	n/a	n/a	n/a
King George, VA	953,251	141,481	953,251	0	53,026	n/a	n/a	n/a
King William, VA	267,175	30,675	267,175	1,009	53,019	0.1%	0.2%	0.5%
Lancaster, VA	373,552	41,394	373,552	0	35,334	n/a	n/a	n/a
Loudoun, VA	5,578,683	300,598	5,578,683	40,196	85,731	0.0%	0.0%	0.2%
Louisa, VA	1,270,611	54,850	1,270,611	0	41,885	n/a	n/a	n/a
Madison, VA	1,018,742	295,516	1,018,742	0	42,368	n/a	n/a	n/a
Mathews, VA	377,538	19,005	377,538	0	45,946	n/a	n/a	n/a
Middlesex, VA	325,400	25,446	325,400	0	39,199	n/a	n/a	n/a
Montgomery, VA	4,481	192	4,481	43	34,368	0.0%	0.1%	0.3%
Nelson, VA	955,708	42,638	955,708	0	39,086	n/a	n/a	n/a
New Kent, VA	647,469	127,795	647,469	0	56,973	n/a	n/a	n/a
Northampton, VA	450,121	20,825	450,121	0	30,058	n/a	n/a	n/a
Northumberland, VA	485,851	25,257	485,851	0	40,532	n/a	n/a	n/a
Nottoway, VA	382,516	25,902	382,516	1,645	32,811	0.0%	0.2%	0.7%
Orange, VA	1,175,849	91,813	1,175,849	3,403	45,592	0.1%	0.2%	0.8%
Page, VA	1,598,018	231,610	1,598,018	2,108	35,461	0.3%	0.7%	2.1%
Powhatan, VA	688,622	44,873	688,622	704	57,395	0.1%	0.5%	1.7%
Prince Edward, VA	998,600	41,967	998,600	1,751	33,274	0.1%	0.4%	1.7%
Prince George, VA	582,754	25,830	582,754	2,503	53,021	0.0%	0.1%	0.4%
Prince William, VA	8,121,820	2,005,006	8,121,820	100,410	70,117	0.0%	0.1%	0.1%
Rappahannock, VA	584,227	121,232	584,227	0	48,839	n/a	n/a	n/a
Richmond, VA	417,328	18,490	417,328	409	35,107	0.1%	0.8%	2.9%
Roanoke, VA	17,427	2,597	17,427	331	50,695	0.0%	0.0%	0.1%

Exhibit H2-5. Urban Screening Variable Values

County	Estimated Urban and Mixed Open BMP Costs (Tier 1)	Estimated Urban and Mixed Open BMP Costs (Tier 2)	Estimated Urban and Mixed Open BMP Costs (Tier 3)	Estimated Urban Households in Watershed (2010)	County MHI from 2000 Census	Estimated BMP Costs per Urban Household as Percent of County MHI (Tier 1)	Estimated BMP Costs per Urban Household as Percent of County MHI (Tier 2)	Estimated BMP Costs per Urban Household as Percent of County MHI (Tier 3)
Rockbridge, VA	2,411,449	107,698	2,411,449	291	38,306	1.0%	5.6%	21.7%
Rockingham, VA	4,266,827	180,115	4,266,827	7,977	43,316	0.1%	0.3%	1.2%
Shenandoah, VA	2,400,130	342,145	2,400,130	3,687	41,642	0.2%	0.5%	1.6%
Spotsylvania, VA	1,877,547	152,341	1,877,547	20,057	61,151	0.0%	0.0%	0.2%
Stafford, VA	3,852,711	339,298	3,852,711	22,700	71,020	0.0%	0.1%	0.2%
Surry, VA	362,862	24,582	362,862	0	39,925	n/a	n/a	n/a
Warren, VA	1,905,534	408,049	1,905,534	6,051	45,096	0.1%	0.3%	0.7%
Westmoreland, VA	886,896	73,097	886,896	1,817	38,053	0.1%	0.4%	1.3%
York, VA	2,906,963	517,797	2,906,963	18,024	61,609	0.0%	0.1%	0.3%
Alexandria City, VA	2,362,818	94,617	2,362,818	60,547	59,587	0.0%	0.0%	0.1%
Buena Vista City, VA	196,340	8,488	196,340	2,332	34,453	0.0%	0.1%	0.2%
Charlottesville City, VA	659,479	28,459	659,479	15,123	32,961	0.0%	0.0%	0.1%
Chesapeake City, VA	4,535,434	689,313	4,535,434	50,698	53,941	0.0%	0.1%	0.2%
Clifton Forge City, VA	135,471	5,866	135,471	1,795	27,734	0.0%	0.1%	0.3%
Colonial Heights City, VA	344,338	15,268	344,338	6,356	45,948	0.0%	0.0%	0.1%
Covington City, VA	193,114	8,391	193,114	2,671	32,236	0.0%	0.1%	0.2%
Fairfax City, VA	431,073	17,550	431,073	7,242	71,905	0.0%	0.0%	0.1%
Falls Church City, VA	143,537	8,529	143,537	4,540	79,646	0.0%	0.0%	0.0%
Fredericksburg City, VA	438,736	86,257	438,736	9,054	36,765	0.0%	0.1%	0.1%
Hampton City, VA	2,987,658	212,853	2,987,658	53,751	42,024	0.0%	0.0%	0.1%
Harrisonburg City, VA	1,008,487	41,641	1,008,487	11,847	31,837	0.0%	0.1%	0.3%
Hopewell City, VA	553,537	24,482	553,537	9,141	35,288	0.0%	0.0%	0.2%
Lexington City, VA	154,219	9,695	154,219	2,298	30,809	0.0%	0.1%	0.2%
Lynchburg City, VA	1,801,568	88,516	1,801,568	25,084	34,266	0.0%	0.1%	0.2%
Manassas City, VA	688,049	158,987	688,049	13,476	64,216	0.0%	0.0%	0.1%
Manassas Park City, VA	104,720	42,745	104,720	3,221	64,626	0.0%	0.0%	0.1%
Newport News City, VA	3,723,597	605,217	3,723,597	76,869	38,904	0.0%	0.0%	0.1%
Norfolk City, VA	3,607,620	156,232	3,607,620	93,347	33,820	0.0%	0.0%	0.1%
Petersburg City, VA	672,053	29,837	672,053	12,922	30,669	0.0%	0.0%	0.2%
Poquoson City, VA	366,369	98,589	366,369	4,772	64,759	0.0%	0.1%	0.1%
Portsmouth City, VA	2,151,085	94,361	2,151,085	38,663	35,869	0.0%	0.0%	0.2%
Richmond City, VA	3,640,331	166,355	3,640,331	79,703	33,082	0.0%	0.0%	0.1%
Staunton City, VA	620,984	25,939	620,984	9,787	35,017	0.0%	0.0%	0.2%
Suffolk, VA	2,757,754	164,093	2,757,754	14,191	43,706	0.0%	0.1%	0.4%
Virginia Beach, VA	6,132,005	2,683,152	6,132,005	150,115	51,775	0.0%	0.1%	0.1%
Waynesboro City, VA	580,914	24,099	580,914	7,984	34,746	0.0%	0.1%	0.2%
Williamsburg City, VA	328,121	33,283	328,121	3,796	39,431	0.0%	0.1%	0.2%

Exhibit H2-5. Urban Screening Variable Values

County	Estimated Urban and Mixed Open BMP Costs (Tier 1)	Estimated Urban and Mixed Open BMP Costs (Tier 2)	Estimated Urban and Mixed Open BMP Costs (Tier 3)	Estimated Urban Households in Watershed (2010)	County MHI from 2000 Census	Estimated BMP Costs per Urban Household as Percent of County MHI (Tier 1)	Estimated BMP Costs per Urban Household as Percent of County MHI (Tier 2)	Estimated BMP Costs per Urban Household as Percent of County MHI (Tier 3)
Winchester City, VA	532,303	99,884	532,303	11,117	36,499	0.0%	0.1%	0.1%
Berkeley, WV	1,870,123	424,641	1,870,123	18,502	41,206	0.1%	0.1%	0.2%
Grant, WV	1,041,053	45,182	1,041,053	886	30,738	0.2%	1.0%	3.8%
Hampshire, WV	869,210	111,845	869,210	0	33,662	n/a	n/a	n/a
Hardy, WV	649,569	65,269	649,569	0	33,853	n/a	n/a	n/a
Jefferson, WV	1,048,983	115,238	1,048,983	5,537	47,171	0.0%	0.1%	0.4%
Mineral, WV	940,989	41,765	940,989	3,740	33,112	0.0%	0.2%	0.8%
Monroe, WV	10,927	450	10,927	29	29,313	0.1%	0.4%	1.3%
Morgan, WV	526,568	55,870	526,568	0	37,223	n/a	n/a	n/a
Pendleton, WV	524,046	24,322	524,046	0	32,347	n/a	n/a	n/a

Note: Costs (see Appendix A for documentation) and MHI are in 2001 $.
n/a = Not applicable (zero estimated urban households in watershed).

Exhibit H2-6. Onsite System Screening Data and Variable Values

County	County MHI from 2000 Census	Estimated Number of Households in Watershed in 2010	Estimated Number of Households Implementing BMPs on Existing Systems (Tier 3)	Estimated BMP Costs per Household Implementing BMPs as Percent of County MHI (Tier 3)	Estimated Percent of Households in Watershed Implementing BMPs on Existing Systems (Tier 3)
Kent, DE	43,531	8,025	39	2.3%	0.5%
New Castle, DE	55,723	1,380	9	1.8%	0.6%
Sussex, DE	41,679	26,472	130	2.4%	0.5%
Washington, DC	42,656	250,451	32	2.4%	0.0%
Allegany, MD	32,764	30,523	79	3.1%	0.3%
Anne Arundel, MD	65,661	186,531	378	1.6%	0.2%
Baltimore, MD	53,860	293,797	348	1.9%	0.1%
Calvert, MD	70,101	32,968	94	1.5%	0.3%
Caroline, MD	41,279	12,263	56	2.5%	0.5%
Carroll, MD	63,804	61,272	238	1.6%	0.4%
Cecil, MD	53,693	31,822	144	1.9%	0.5%
Charles, MD	66,119	52,471	110	1.5%	0.2%
Dorchester, MD	36,225	13,139	70	2.8%	0.5%
Frederick, MD	64,075	87,397	248	1.6%	0.3%
Garrett, MD	34,270	2,106	5	3.0%	0.2%
Harford, MD	60,841	89,875	129	1.7%	0.1%
Howard, MD	78,841	104,887	104	1.3%	0.1%
Kent, MD	42,382	7,807	38	2.4%	0.5%
Montgomery, MD	76,061	351,196	211	1.3%	0.1%
Prince Georges, MD	58,739	318,358	258	1.7%	0.1%
Queen Annes, MD	60,632	17,972	74	1.7%	0.4%
St Marys, MD	58,154	35,721	122	1.8%	0.3%
Somerset, MD	31,788	9,072	46	3.2%	0.5%
Talbot, MD	46,276	14,979	47	2.2%	0.3%
Washington, MD	43,177	52,153	179	2.4%	0.3%
Wicomico, MD	41,495	35,246	134	2.5%	0.4%
Worcester, MD	43,212	7,689	26	2.4%	0.3%
Baltimore City, MD	31,974	266,454	50	3.2%	0.0%
Allegany, NY	34,129	2,811	11	3.0%	0.4%
Broome, NY	37,575	80,523	351	2.7%	0.4%
Chemung, NY	38,710	35,487	147	2.6%	0.4%
Chenango, NY	35,802	22,355	92	2.8%	0.4%
Cortland, NY	36,530	18,536	69	2.8%	0.4%
Delaware, NY	34,507	5,860	26	3.0%	0.4%
Herkimer, NY	34,999	1,761	7	2.9%	0.4%
Livingston, NY	44,717	118	1	2.3%	0.5%
Madison, NY	42,717	7,708	34	2.4%	0.4%

Exhibit H2-6. Onsite System Screening Data and Variable Values

County	County MHI from 2000 Census	Estimated Number of Households in Watershed in 2010	Estimated Number of Households Implementing BMPs on Existing Systems (Tier 3)	Estimated BMP Costs per Household Implementing BMPs as Percent of County MHI (Tier 3)	Estimated Percent of Households in Watershed Implementing BMPs on Existing Systems (Tier 3)
Oneida, NY	38,172	965	4	2.7%	0.5%
Onondaga, NY	43,421	1,130	5	2.3%	0.4%
Ontario, NY	47,389	39	0	2.2%	0.0%
Otsego, NY	35,552	23,896	109	2.9%	0.5%
Schoharie, NY	38,891	469	2	2.6%	0.5%
Schuyler, NY	38,280	1,906	8	2.7%	0.4%
Steuben, NY	37,715	37,129	149	2.7%	0.4%
Tioga, NY	42,804	19,933	89	2.4%	0.4%
Tompkins, NY	39,621	1,151	4	2.6%	0.4%
Yates, NY	36,823	118	0.5	2.8%	0.4%
Adams, PA	45,395	35,175	109	2.2%	0.3%
Bedford, PA	34,794	20,526	115	2.9%	0.6%
Berks, PA	47,532	4,593	11	2.1%	0.2%
Blair, PA	34,932	55,258	178	2.9%	0.3%
Bradford, PA	37,246	23,892	85	2.7%	0.4%
Cambria, PA	32,081	13,166	41	3.2%	0.3%
Cameron, PA	34,242	2,208	5	3.0%	0.2%
Centre, PA	38,444	51,719	140	2.7%	0.3%
Chester, PA	69,410	12,628	62	1.5%	0.5%
Clearfield, PA	33,333	22,582	68	3.1%	0.3%
Clinton, PA	33,022	15,341	37	3.1%	0.2%
Columbia, PA	36,243	25,094	67	2.8%	0.3%
Cumberland, PA	49,651	85,988	253	2.1%	0.3%
Dauphin, PA	44,123	99,743	273	2.3%	0.3%
Elk, PA	39,917	2,146	5	2.6%	0.2%
Franklin, PA	43,027	52,083	169	2.4%	0.3%
Fulton, PA	37,080	6,137	23	2.8%	0.4%
Huntingdon, PA	35,413	17,303	68	2.9%	0.4%
Indiana, PA	32,138	1,592	5	3.2%	0.3%
Jefferson, PA	33,721	25	0	0.0%	0.0%
Juniata, PA	36,885	8,646	31	2.8%	0.4%
Lackawanna, PA	36,608	80,550	174	2.8%	0.2%
Lancaster, PA	48,375	189,702	503	2.1%	0.3%
Lebanon, PA	43,412	41,325	112	2.3%	0.3%
Luzerne, PA	35,899	115,048	273	2.8%	0.2%
Lycoming, PA	36,160	50,344	167	2.8%	0.3%
Mckean, PA	35,122	19	0.03	2.9%	0.2%

Exhibit H2-6. Onsite System Screening Data and Variable Values

County	County MHI from 2000 Census	Estimated Number of Households in Watershed in 2010	Estimated Number of Households Implementing BMPs on Existing Systems (Tier 3)	Estimated BMP Costs per Household Implementing BMPs as Percent of County MHI (Tier 3)	Estimated Percent of Households in Watershed Implementing BMPs on Existing Systems (Tier 3)
Mifflin, PA	34,203	19,820	64	3.0%	0.3%
Montour, PA	40,475	7,193	23	2.5%	0.3%
Northumberland, PA	33,288	38,095	115	3.1%	0.3%
Perry, PA	44,550	19,380	55	2.3%	0.3%
Potter, PA	34,286	2,016	5	3.0%	0.3%
Schuylkill, PA	34,760	23,893	68	2.9%	0.3%
Snyder, PA	38,249	15,225	46	2.7%	0.3%
Somerset, PA	32,859	906	3	3.1%	0.3%
Sullivan, PA	32,187	2,439	10	3.2%	0.4%
Susquehanna, PA	35,741	17,388	53	2.9%	0.3%
Tioga, PA	34,038	17,128	54	3.0%	0.3%
Union, PA	42,878	13,219	68	2.4%	0.5%
Wayne, PA	36,230	536	2	2.8%	0.3%
Wyoming, PA	38,657	11,772	27	2.6%	0.2%
York, PA	48,121	149,036	457	2.1%	0.3%
Accomack, VA	32,157	8,145	43	3.2%	0.5%
Albemarle, VA	53,947	33,364	131	1.9%	0.4%
Alleghany, VA	40,974	4,818	23	2.5%	0.5%
Amelia, VA	42,789	3,741	22	2.4%	0.6%
Amherst, VA	39,750	11,124	47	2.6%	0.4%
Appomattox, VA	38,808	3,571	17	2.6%	0.5%
Arlington City, VA	66,972	83,418	9	1.5%	0.0%
Augusta, VA	45,758	23,094	92	2.2%	0.4%
Bath, VA	37,220	1,829	9	2.7%	0.5%
Bedford, VA	45,855	5,230	22	2.2%	0.4%
Botetourt, VA	51,802	5,391	27	2.0%	0.5%
Buckingham, VA	31,765	4,638	22	3.2%	0.5%
Campbell, VA	39,630	6,204	24	2.6%	0.4%
Caroline, VA	42,356	7,869	50	2.4%	0.6%
Charles City, VA	45,439	2,350	3	2.2%	0.1%
Chesterfield, VA	62,226	113,702	125	1.6%	0.1%
Clarke, VA	54,853	6,293	24	1.9%	0.4%
Craig, VA	39,666	1,728	8	2.6%	0.5%
Culpeper, VA	48,144	14,284	78	2.1%	0.5%
Cumberland, VA	33,821	3,233	15	3.0%	0.5%
Dinwiddie, VA	44,203	3,234	10	2.3%	0.3%
Essex, VA	39,752	3,558	12	2.6%	0.3%

Exhibit H2-6. Onsite System Screening Data and Variable Values

County	County MHI from 2000 Census	Estimated Number of Households in Watershed in 2010	Estimated Number of Households Implementing BMPs on Existing Systems (Tier 3)	Estimated BMP Costs per Household Implementing BMPs as Percent of County MHI (Tier 3)	Estimated Percent of Households in Watershed Implementing BMPs on Existing Systems (Tier 3)
Fairfax, VA	86,158	386,200	193	1.2%	0.1%
Fauquier, VA	65,907	26,079	71	1.5%	0.3%
Fluvanna, VA	49,295	5,972	25	2.1%	0.4%
Frederick, VA	49,899	24,213	101	2.0%	0.4%
Giles, VA	37,128	54	0.2	2.7%	0.5%
Gloucester, VA	48,284	17,380	94	2.1%	0.5%
Goochland, VA	59,856	7,254	19	1.7%	0.3%
Greene, VA	48,826	5,560	26	2.1%	0.5%
Hanover, VA	62,956	33,706	135	1.6%	0.4%
Henrico, VA	52,285	112,432	165	2.0%	0.1%
Highland, VA	31,606	1,070	5	3.2%	0.4%
Isle Of Wight, VA	48,248	9,411	12	2.1%	0.1%
James City, VA	59,098	21,335	27	1.7%	0.1%
King And Queen, VA	38,206	2,821	15	2.7%	0.5%
King George, VA	53,026	6,565	22	1.9%	0.3%
King William, VA	53,019	5,208	28	1.9%	0.5%
Lancaster, VA	35,334	5,354	21	2.9%	0.4%
Loudoun, VA	85,731	47,675	61	1.2%	0.1%
Louisa, VA	41,885	9,302	63	2.4%	0.7%
Madison, VA	42,368	5,792	28	2.4%	0.5%
Mathews, VA	45,946	3,885	30	2.2%	0.8%
Middlesex, VA	39,199	4,325	19	2.6%	0.4%
Montgomery, VA	34,368	62	0.3	3.0%	0.5%
Nelson, VA	39,086	5,623	22	2.6%	0.4%
New Kent, VA	56,973	5,311	13	1.8%	0.2%
Northampton, VA	30,058	3,821	21	3.4%	0.5%
Northumberland, VA	40,532	5,397	26	2.5%	0.5%
Nottoway, VA	32,811	3,559	22	3.1%	0.6%
Orange, VA	45,592	10,592	64	2.2%	0.6%
Page, VA	35,461	10,132	37	2.9%	0.4%
Powhatan, VA	57,395	6,904	23	1.8%	0.3%
Prince Edward, VA	33,274	6,109	41	3.1%	0.7%
Prince George, VA	53,021	6,204	8	1.9%	0.1%
Prince William, VA	70,117	111,768	162	1.5%	0.1%
Rappahannock, VA	48,839	3,194	16	2.1%	0.5%
Richmond, VA	35,107	2,618	9	2.9%	0.3%
Roanoke, VA	50,695	424	2	2.0%	0.5%

Exhibit H2-6. Onsite System Screening Data and Variable Values

County	County MHI from 2000 Census	Estimated Number of Households in Watershed in 2010	Estimated Number of Households Implementing BMPs on Existing Systems (Tier 3)	Estimated BMP Costs per Household Implementing BMPs as Percent of County MHI (Tier 3)	Estimated Percent of Households in Watershed Implementing BMPs on Existing Systems (Tier 3)
Rockbridge, VA	38,306	7,916	37	2.7%	0.5%
Rockingham, VA	43,316	24,283	104	2.4%	0.4%
Shenandoah, VA	41,642	15,520	66	2.4%	0.4%
Spotsylvania, VA	61,151	30,764	140	1.7%	0.5%
Stafford, VA	71,020	30,929	127	1.4%	0.4%
Surry, VA	39,925	1,530	2	2.6%	0.1%
Warren, VA	45,096	13,768	59	2.3%	0.4%
Westmoreland, VA	38,053	7,065	22	2.7%	0.3%
York, VA	61,609	19,914	44	1.7%	0.2%
Alexandria City, VA	59,587	60,547	6	1.7%	0.0%
Buena Vista City, VA	34,453	2,405	11	3.0%	0.5%
Charlottesville City, VA	32,961	15,421	65	3.1%	0.4%
Chesapeake City, VA	53,941	56,302	17	1.9%	0.0%
Clifton Forge City, VA	27,734	1,802	8	3.7%	0.4%
Colonial Heights City, VA	45,948	6,356	6	2.2%	0.1%
Covington City, VA	32,236	2,671	11	3.2%	0.4%
Fairfax City, VA	71,905	7,598	2	1.4%	0.0%
Falls Church City, VA	79,646	4,546	1	1.3%	0.0%
Fredericksburg City, VA	36,765	9,177	25	2.8%	0.3%
Hampton City, VA	42,024	53,856	52	2.4%	0.1%
Harrisonburg City, VA	31,837	11,932	54	3.2%	0.5%
Hopewell City, VA	35,288	9,141	9	2.9%	0.1%
Lexington City, VA	30,809	2,302	14	3.3%	0.6%
Lynchburg City, VA	34,266	25,866	104	3.0%	0.4%
Manassas City, VA	64,216	13,518	21	1.6%	0.2%
Manassas Park, VA	64,626	3,221	5	1.6%	0.1%
Newport News City, VA	38,904	76,913	74	2.6%	0.1%
Norfolk City, VA	33,820	93,347	25	3.0%	0.0%
Petersburg City, VA	30,669	13,260	12	3.3%	0.1%
Poquoson City, VA	64,759	4,983	5	1.6%	0.1%
Portsmouth City, VA	35,869	38,663	24	2.8%	0.1%
Richmond City, VA	33,082	80,022	83	3.1%	0.1%
Staunton City, VA	35,017	9,876	36	2.9%	0.4%
Suffolk, VA	43,706	19,572	52	2.3%	0.3%
Virginia Beach, VA	51,775	152,198	31	2.0%	0.0%
Waynesboro City, VA	34,746	8,171	28	2.9%	0.3%
Williamsburg City, VA	39,431	3,796	11	2.6%	0.3%

Exhibit H2-6. Onsite System Screening Data and Variable Values

County	County MHI from 2000 Census	Estimated Number of Households in Watershed in 2010	Estimated Number of Households Implementing BMPs on Existing Systems (Tier 3)	Estimated BMP Costs per Household Implementing BMPs as Percent of County MHI (Tier 3)	Estimated Percent of Households in Watershed Implementing BMPs on Existing Systems (Tier 3)
Winchester City, VA	36,499	11,124	39	2.8%	0.4%
Berkeley, WV	41,206	34,097	128	2.5%	0.4%
Grant, WV	30,738	3,945	18	3.3%	0.5%
Hampshire, WV	33,662	7,945	47	3.0%	0.6%
Hardy, WV	33,853	5,390	30	3.0%	0.6%
Jefferson, WV	47,171	17,588	72	2.2%	0.4%
Mineral, WV	33,112	10,088	28	3.1%	0.3%
Monroe, WV	29,313	283	1	3.5%	0.3%
Morgan, WV	37,223	5,946	31	2.7%	0.5%
Pendleton, WV	32,347	3,361	17	3.2%	0.5%

Note: MHI is in 2001 $.

Exhibit H2-7. Total Urban Screening Data and Variable Values

County	Estimated Urban Households in Watershed (2010)	Estimated Facility-weighted Current Sewer Rate	County MHI from 2000 Census	Estimated Urban, Mixed Open and POTW Costs per Urban Household as Percent of County MHI (Tier 1)	Estimated Urban, Mixed Open and POTW Costs per Urban Household as Percent of County MHI (Tier 2)	Estimated Urban, Mixed Open and POTW Costs per Urban Household as Percent of County MHI (Tier 3)
Kent, DE	5,176	0	43,531	0.0%	0.1%	0.1%
New Castle, DE	1,303	0	55,723	0.0%	0.1%	0.3%
Sussex, DE	12,316	345	41,679	1.0%	1.1%	1.3%
Washington, DC	250,451	196	42,656	0.5%	0.5%	0.7%
Allegany, MD	22,684	222	32,764	0.8%	0.9%	1.2%
Anne Arundel, MD	176,044	169	65,661	0.3%	0.3%	0.4%
Baltimore, MD	275,563	169	53,860	0.3%	0.3%	0.4%
Calvert, MD	17,831	240	70,101	0.4%	0.5%	0.7%
Caroline, MD	2,623	200	41,279	0.9%	1.1%	1.6%
Carroll, MD	34,855	200	63,804	0.4%	0.4%	0.5%
Cecil, MD	15,234	240	53,693	0.6%	0.7%	0.9%
Charles, MD	34,780	200	66,119	0.4%	0.4%	0.6%
Dorchester, MD	5,317	200	36,225	1.0%	1.2%	1.8%
Frederick, MD	62,739	115	64,075	0.2%	0.3%	0.3%
Garrett, MD	353	0	34,270	0.2%	1.1%	4.0%
Harford, MD	69,904	127	60,841	0.3%	0.3%	0.4%
Howard, MD	91,673	98	78,841	0.2%	0.2%	0.2%
Kent, MD	2,048	108	42,382	0.6%	0.7%	1.1%
Montgomery, MD	341,190	183	76,061	0.3%	0.3%	0.3%
Prince Georges, MD	307,724	190	58,739	0.3%	0.4%	0.5%
Queen Annes, MD	7,058	375	60,632	1.0%	1.1%	1.3%
St Marys, MD	13,662	200	58,154	0.5%	0.6%	1.0%
Somerset, MD	4,383	234	31,788	1.1%	1.2%	1.7%
Talbot, MD	5,501	200	46,276	0.5%	0.7%	1.1%
Washington, MD	35,352	200	43,177	0.5%	0.6%	0.8%
Wicomico, MD	24,096	200	41,495	0.7%	0.7%	0.9%
Worcester, MD	4,889	200	43,212	0.7%	0.7%	0.9%
Baltimore City, MD	266,454	200	31,974	0.8%	0.8%	0.9%
Allegany, NY	580	0	34,129	0.1%	0.5%	1.8%
Broome, NY	59,404	200	37,575	0.5%	0.6%	0.9%
Chemung, NY	26,195	200	38,710	0.5%	0.8%	1.0%
Chenango, NY	3,801	200	35,802	0.8%	1.3%	2.3%
Cortland, NY	10,176	200	36,530	0.6%	0.6%	0.9%
Delaware, NY	867	200	34,507	0.7%	2.2%	3.9%

Exhibit H2-7. Total Urban Screening Data and Variable Values

County	Estimated Urban Households in Watershed (2010)	Estimated Facility-weighted Current Sewer Rate	County MHI from 2000 Census	Estimated Urban, Mixed Open and POTW Costs per Urban Household as Percent of County MHI (Tier 1)	Estimated Urban, Mixed Open and POTW Costs per Urban Household as Percent of County MHI (Tier 2)	Estimated Urban, Mixed Open and POTW Costs per Urban Household as Percent of County MHI (Tier 3)
Herkimer, NY	853	0	34,999	0.1%	0.2%	0.8%
Livingston, NY	53	0	44,717	0.0%	0.0%	0.0%
Madison, NY	3,220	200	42,717	0.5%	0.7%	0.9%
Oneida, NY	624	0	38,172	0.0%	0.1%	0.2%
Onondaga, NY	979	0	43,421	0.0%	0.1%	0.2%
Ontario, NY	19	0	47,389	0.0%	0.0%	0.0%
Otsego, NY	6,214	200	35,552	0.6%	1.2%	1.9%
Schoharie, NY	79	0	38,891	0.0%	0.3%	1.0%
Schuyler, NY	389	0	38,280	0.1%	0.5%	1.9%
Steuben, NY	13,960	200	37,715	0.6%	1.1%	1.8%
Tioga, NY	6,966	200	42,804	0.5%	0.8%	1.4%
Tompkins, NY	667	0	39,621	0.0%	0.1%	0.3%
Yates, NY	31	0	36,823	0.1%	0.2%	0.5%
Adams, PA	14,138	206	45,395	0.5%	0.6%	0.9%
Bedford, PA	3,211	200	34,794	0.8%	1.4%	2.2%
Berks, PA	3,345	0	47,532	0.0%	0.1%	0.2%
Blair, PA	40,914	209	34,932	0.6%	0.8%	1.1%
Bradford, PA	6,642	301	37,246	0.9%	1.2%	1.8%
Cambria, PA	8,898	0	32,081	0.0%	0.1%	0.3%
Cameron, PA	1,246	0	34,242	0.1%	0.3%	0.7%
Centre, PA	33,239	227	38,444	0.6%	0.8%	1.0%
Chester, PA	10,227	0	69,410	0.0%	0.0%	0.1%
Clearfield, PA	10,376	144	33,333	0.5%	1.0%	2.3%
Clinton, PA	7,551	200	33,022	0.9%	1.1%	1.8%
Columbia, PA	13,977	200	36,243	0.6%	0.8%	1.1%
Cumberland, PA	64,378	211	49,651	0.4%	0.6%	0.7%
Dauphin, PA	85,051	216	44,123	0.6%	0.6%	0.8%
Elk, PA	1,120	0	39,917	0.1%	0.3%	0.7%
Franklin, PA	27,515	217	43,027	0.6%	0.7%	1.0%
Fulton, PA	0	0	37,080	n/a	n/a	n/a
Huntingdon, PA	5,318	200	35,413	0.6%	1.0%	1.4%
Indiana, PA	603	0	32,138	0.1%	0.6%	2.0%
Jefferson, PA	0	0	33,721	n/a	n/a	n/a
Juniata, PA	1,265	220	36,885	0.7%	1.3%	1.9%

Exhibit H2-7. Total Urban Screening Data and Variable Values

County	Estimated Urban Households in Watershed (2010)	Estimated Facility-weighted Current Sewer Rate	County MHI from 2000 Census	Estimated Urban, Mixed Open and POTW Costs per Urban Household as Percent of County MHI (Tier 1)	Estimated Urban, Mixed Open and POTW Costs per Urban Household as Percent of County MHI (Tier 2)	Estimated Urban, Mixed Open and POTW Costs per Urban Household as Percent of County MHI (Tier 3)
Lackawanna, PA	66,460	148	36,608	0.4%	0.6%	0.8%
Lancaster, PA	142,899	199	48,375	0.4%	0.5%	0.6%
Lebanon, PA	28,486	184	43,412	0.4%	0.5%	0.8%
Luzerne, PA	91,593	125	35,899	0.4%	0.5%	0.8%
Lycoming, PA	32,226	137	36,160	0.5%	0.6%	1.0%
Mckean, PA	7	0	35,122	1.0%	1.5%	3.0%
Mifflin, PA	8,755	273	34,203	0.9%	1.2%	1.5%
Montour, PA	3,284	200	40,475	0.5%	0.9%	1.5%
Northumberland, PA	24,009	195	33,288	0.6%	0.9%	1.2%
Perry, PA	2,647	600	44,550	1.5%	1.8%	2.2%
Potter, PA	0	0	34,286	n/a	n/a	n/a
Schuylkill, PA	15,177	217	34,760	0.7%	0.9%	1.4%
Snyder, PA	4,365	200	38,249	0.7%	0.8%	1.1%
Somerset, PA	231	0	32,859	0.3%	0.5%	1.4%
Sullivan, PA	0	0	32,187	n/a	n/a	n/a
Susquehanna, PA	3,218	184	35,741	0.7%	1.1%	1.9%
Tioga, PA	2,686	200	34,038	1.0%	2.4%	4.2%
Union, PA	7,270	272	42,878	0.8%	0.9%	1.3%
Wayne, PA	86	0	36,230	0.3%	1.3%	4.7%
Wyoming, PA	1,769	0	38,657	0.4%	1.1%	3.1%
York, PA	106,586	201	48,121	0.4%	0.5%	0.6%
Accomack, VA	813	268	32,157	1.0%	2.9%	4.7%
Albemarle, VA	17,236	138	53,947	0.3%	0.5%	0.8%
Alleghany, VA	1,255	402	40,974	1.1%	2.1%	3.7%
Amelia, VA	0	0	42,789	n/a	n/a	n/a
Amherst, VA	4,109	289	39,750	0.8%	3.8%	5.4%
Appomattox, VA	0	0	38,808	n/a	n/a	n/a
Arlington City, VA	83,402	151	66,972	0.2%	0.2%	0.3%
Augusta, VA	5,075	183	45,758	0.5%	1.1%	2.5%
Bath, VA	0	0	37,220	n/a	n/a	n/a
Bedford, VA	800	0	45,855	0.3%	1.1%	3.7%
Botetourt, VA	1,772	0	51,802	0.1%	0.5%	1.8%
Buckingham, VA	0	0	31,765	n/a	n/a	n/a
Campbell, VA	2,374	0	39,630	0.1%	0.3%	1.0%

Exhibit H2-7. Total Urban Screening Data and Variable Values

County	Estimated Urban Households in Watershed (2010)	Estimated Facility-weighted Current Sewer Rate	County MHI from 2000 Census	Estimated Urban, Mixed Open and POTW Costs per Urban Household as Percent of County MHI (Tier 1)	Estimated Urban, Mixed Open and POTW Costs per Urban Household as Percent of County MHI (Tier 2)	Estimated Urban, Mixed Open and POTW Costs per Urban Household as Percent of County MHI (Tier 3)
Caroline, VA	0	200	42,356	n/a	n/a	n/a
Charles City, VA	0	0	45,439	n/a	n/a	n/a
Chesterfield, VA	101,740	190	62,226	0.3%	0.4%	0.5%
Clarke, VA	1,487	0	54,853	0.1%	0.2%	0.3%
Craig, VA	0	0	39,666	n/a	n/a	n/a
Culpeper, VA	4,047	222	48,144	1.0%	1.2%	1.9%
Cumberland, VA	125	0	33,821	0.5%	3.1%	11.6%
Dinwiddie, VA	870	0	44,203	0.1%	0.5%	1.8%
Essex, VA	692	78	39,752	0.2%	1.3%	2.3%
Fairfax, VA	380,757	233	86,158	0.3%	0.3%	0.4%
Fauquier, VA	7,206	353	65,907	0.9%	1.2%	1.6%
Fluvanna, VA	1,775	271	49,295	0.6%	1.2%	2.4%
Frederick, VA	12,284	255	49,899	0.5%	0.6%	0.9%
Giles, VA	9	0	37,128	0.0%	0.0%	0.0%
Gloucester, VA	4,863	0	48,284	0.3%	0.4%	0.7%
Goochland, VA	384	0	59,856	1.1%	1.9%	4.3%
Greene, VA	0	0	48,826	n/a	n/a	n/a
Hanover, VA	19,071	335	62,956	0.6%	0.7%	0.9%
Henrico, VA	106,102	190	52,285	0.4%	0.5%	0.8%
Highland, VA	0	0	31,606	n/a	n/a	n/a
Isle Of Wight, VA	3,202	0	48,248	0.1%	0.3%	1.0%
James City, VA	15,113	144	59,098	0.3%	0.5%	0.7%
King And Queen, VA	0	0	38,206	n/a	n/a	n/a
King George, VA	0	304	53,026	n/a	n/a	n/a
King William, VA	1,009	236	53,019	0.5%	1.4%	2.0%
Lancaster, VA	0	456	35,334	n/a	n/a	n/a
Loudoun, VA	40,196	217	85,731	0.3%	0.3%	0.5%
Louisa, VA	0	0	41,885	n/a	n/a	n/a
Madison, VA	0	0	42,368	n/a	n/a	n/a
Mathews, VA	0	213	45,946	n/a	n/a	n/a
Middlesex, VA	0	328	39,199	n/a	n/a	n/a
Montgomery, VA	43	0	34,368	0.0%	0.1%	0.3%
Nelson, VA	0	0	39,086	n/a	n/a	n/a
New Kent, VA	0	0	56,973	n/a	n/a	n/a

Exhibit H2-7. Total Urban Screening Data and Variable Values

County	Estimated Urban Households in Watershed (2010)	Estimated Facility-weighted Current Sewer Rate	County MHI from 2000 Census	Estimated Urban, Mixed Open and POTW Costs per Urban Household as Percent of County MHI (Tier 1)	Estimated Urban, Mixed Open and POTW Costs per Urban Household as Percent of County MHI (Tier 2)	Estimated Urban, Mixed Open and POTW Costs per Urban Household as Percent of County MHI (Tier 3)
Northampton, VA	0	168	30,058	n/a	n/a	n/a
Northumberland, VA	0	200	40,532	n/a	n/a	n/a
Nottoway, VA	1,645	263	32,811	0.8%	1.4%	2.0%
Orange, VA	3,403	339	45,592	1.0%	1.4%	2.1%
Page, VA	2,108	256	35,461	1.0%	1.5%	3.3%
Powhatan, VA	704	0	57,395	0.1%	0.5%	1.7%
Prince Edward, VA	1,751	123	33,274	0.4%	0.9%	2.4%
Prince George, VA	2,503	0	53,021	0.0%	0.1%	0.4%
Prince William, VA	100,410	288	70,117	0.4%	0.5%	0.5%
Rappahannock, VA	0	727	48,839	n/a	n/a	n/a
Richmond, VA	409	451	35,107	1.4%	3.6%	5.9%
Roanoke, VA	331	0	50,695	0.0%	0.0%	0.1%
Rockbridge, VA	291	269	38,306	1.7%	6.6%	24.2%
Rockingham, VA	7,977	159	43,316	0.4%	0.8%	1.9%
Shenandoah, VA	3,687	279	41,642	0.9%	1.6%	3.0%
Spotsylvania, VA	20,057	312	61,151	0.5%	0.6%	0.7%
Stafford, VA	22,700	300	71,020	0.5%	0.6%	0.8%
Surry, VA	0	0	39,925	n/a	n/a	n/a
Warren, VA	6,051	200	45,096	0.6%	0.7%	1.3%
Westmoreland, VA	1,817	459	38,053	1.3%	1.6%	2.9%
York, VA	18,024	378	61,609	0.8%	0.8%	1.1%
Alexandria City, VA	60,547	249	59,587	0.4%	0.4%	0.5%
Buena Vista City, VA	2,332	230	34,453	0.7%	1.2%	1.5%
Charlottesville City, VA	15,123	0	32,961	0.0%	0.0%	0.1%
Chesapeake City, VA	50,698	239	53,941	0.5%	0.8%	1.0%
Clifton Forge City, VA	1,795	276	27,734	1.0%	1.7%	2.2%
Colonial Heights, VA	6,356	0	45,948	0.0%	0.0%	0.1%
Covington City, VA	2,671	264	32,236	0.8%	1.4%	1.7%
Fairfax City, VA	7,242	0	71,905	0.0%	0.0%	0.1%
Falls Church City, VA	4,540	0	79,646	0.0%	0.0%	0.0%
Fredericksburg City, VA	9,054	0	36,765	0.0%	0.1%	0.1%
Hampton City, VA	53,751	0	42,024	0.0%	0.0%	0.1%
Harrisonburg City, VA	11,847	0	31,837	0.0%	0.1%	0.3%
Hopewell City, VA	9,141	0	35,288	0.0%	0.0%	0.2%

Exhibit H2-7. Total Urban Screening Data and Variable Values

County	Estimated Urban Households in Watershed (2010)	Estimated Facility-weighted Current Sewer Rate	County MHI from 2000 Census	Estimated Urban, Mixed Open and POTW Costs per Urban Household as Percent of County MHI (Tier 1)	Estimated Urban, Mixed Open and POTW Costs per Urban Household as Percent of County MHI (Tier 2)	Estimated Urban, Mixed Open and POTW Costs per Urban Household as Percent of County MHI (Tier 3)
Lexington City, VA	2,298	0	30,809	0.0%	0.1%	0.2%
Lynchburg City, VA	25,084	0	34,266	0.0%	0.1%	0.2%
Manassas City, VA	13,476	0	64,216	0.0%	0.0%	0.1%
Manassas Park City, VA	3,221	0	64,626	0.0%	0.0%	0.1%
Newport News City, VA	76,869	0	38,904	0.0%	0.0%	0.1%
Norfolk City, VA	93,347	343	33,820	1.0%	1.3%	1.5%
Petersburg City, VA	12,922	74	30,669	0.5%	0.5%	0.8%
Poquoson City, VA	4,772	0	64,759	0.0%	0.1%	0.1%
Portsmouth City, VA	38,663	343	35,869	1.0%	1.0%	1.3%
Richmond City, VA	79,703	338	33,082	1.3%	1.3%	1.4%
Staunton City, VA	9,787	197	35,017	0.6%	0.6%	0.9%
Suffolk, VA	14,191	0	43,706	0.0%	0.1%	0.4%
Virginia Beach, VA	150,115	147	51,775	0.3%	0.3%	0.4%
Waynesboro City, VA	7,984	0	34,746	0.0%	0.1%	0.2%
Williamsburg City, VA	3,796	0	39,431	0.0%	0.1%	0.2%
Winchester City, VA	11,117	0	36,499	0.0%	0.1%	0.1%
Berkeley, WV	18,502	347	41,206	0.9%	1.1%	1.3%
Grant, WV	886	200	30,738	0.8%	2.4%	5.5%
Hampshire, WV	0	270	33,662	n/a	n/a	n/a
Hardy, WV	0	200	33,853	n/a	n/a	n/a
Jefferson, WV	5,537	239	47,171	0.6%	0.7%	1.0%
Mineral, WV	3,740	312	33,112	1.0%	1.4%	2.0%
Monroe, WV	29	0	29,313	0.1%	0.4%	1.3%
Morgan, WV	0	0	37,223	n/a	n/a	n/a
Pendleton, WV	0	0	32,347	n/a	n/a	n/a

Note: Costs (see Exhibits A2-1 and A2-5), MHI and Estimated Facility-Weighted Current Sewer Rate are in 2001 $.
n/a = Not applicable (zero estimated urban households in watershed).

Attachment 3: Tier 2 Maps

Exhibit H3-1. Comparison of Total Household Sewer Costs to Median Household Income: Tier 2
(POTW Screening Variable Values)

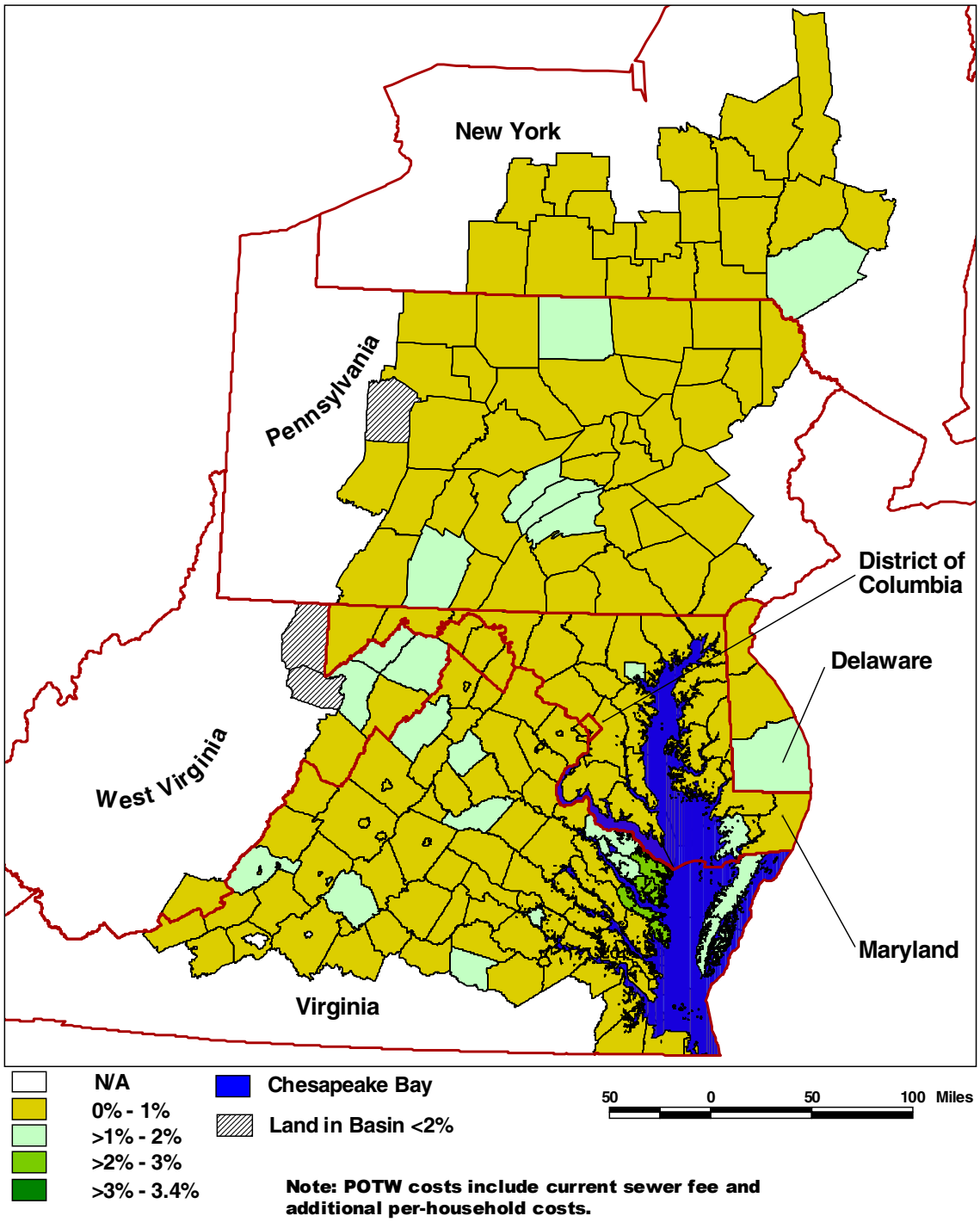

Exhibit H3-2. Comparison of Average Agricultural BMP Costs to Median Household Income: Tier 2 (Agricultural Sector Screening Variable Values)

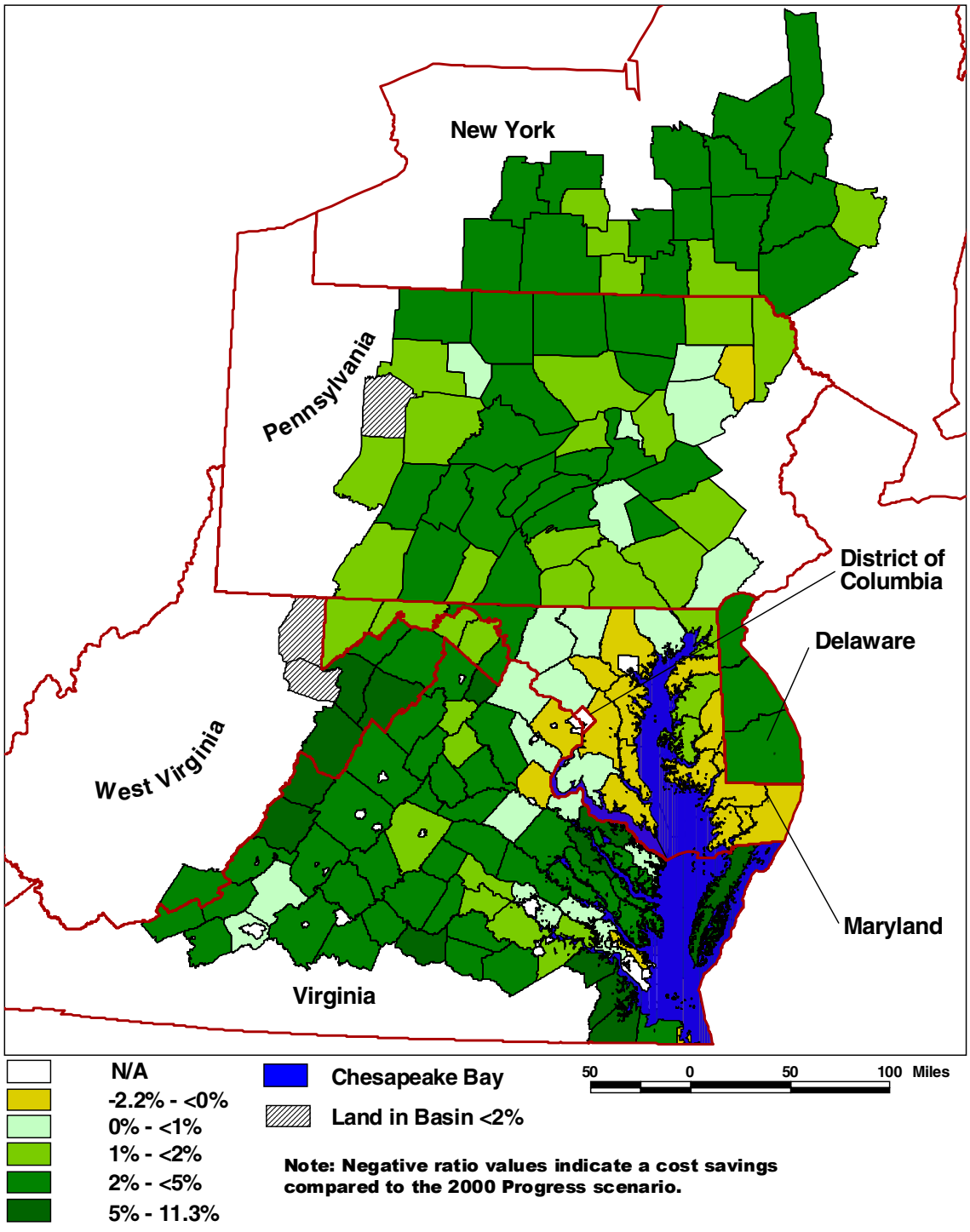

Exhibit H3-3. Comparison of Crop and Portion of Hay BMP Costs to Crop and Hay Sales: Tier 2
(Agricultural Sector Screening Variable Values)

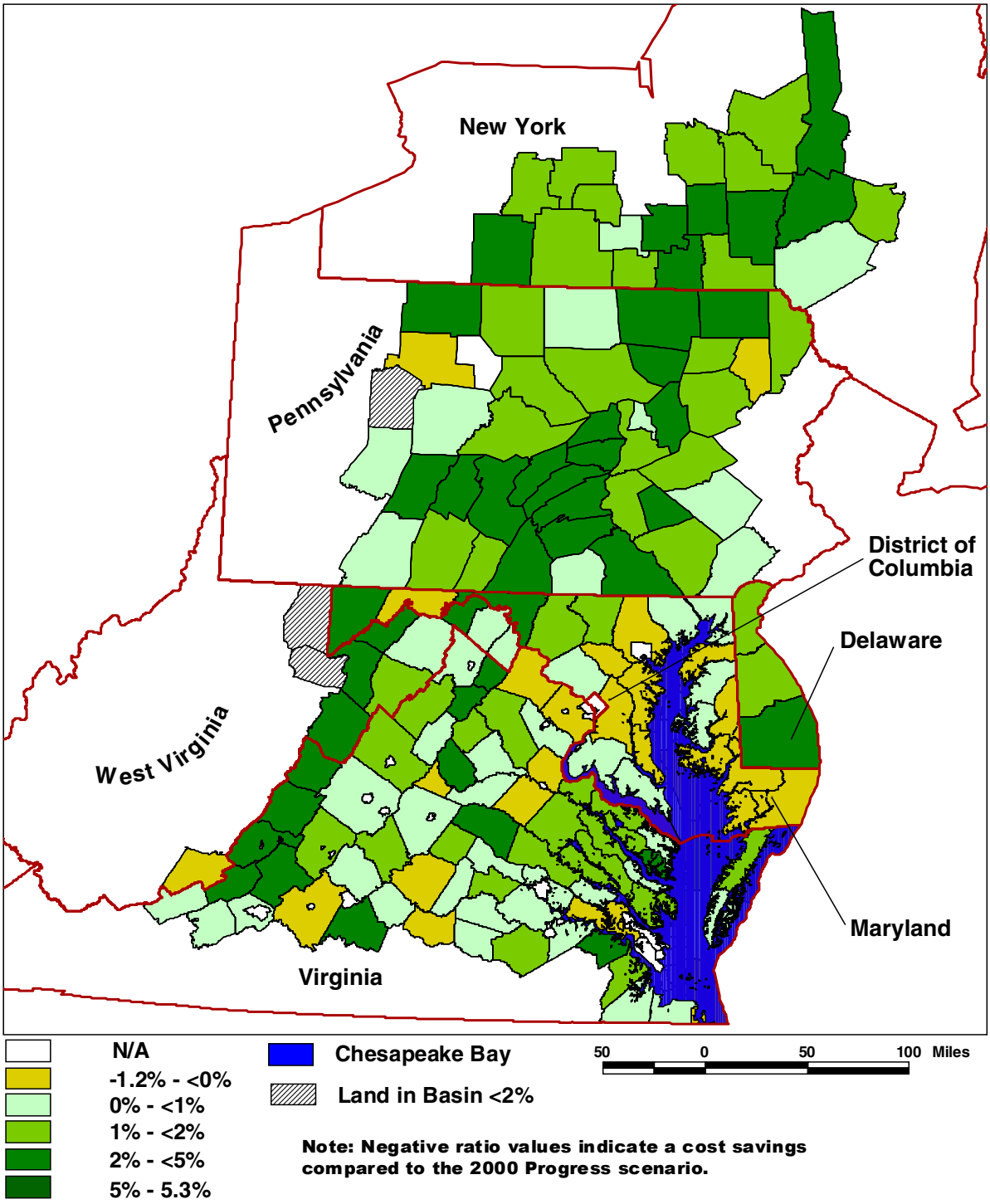

Exhibit H3-4. Comparison of Livestock and Portion of Hay BMP Costs to Livestock Sales: Tier 2 (Agricultural Sector Screening Variable Values)

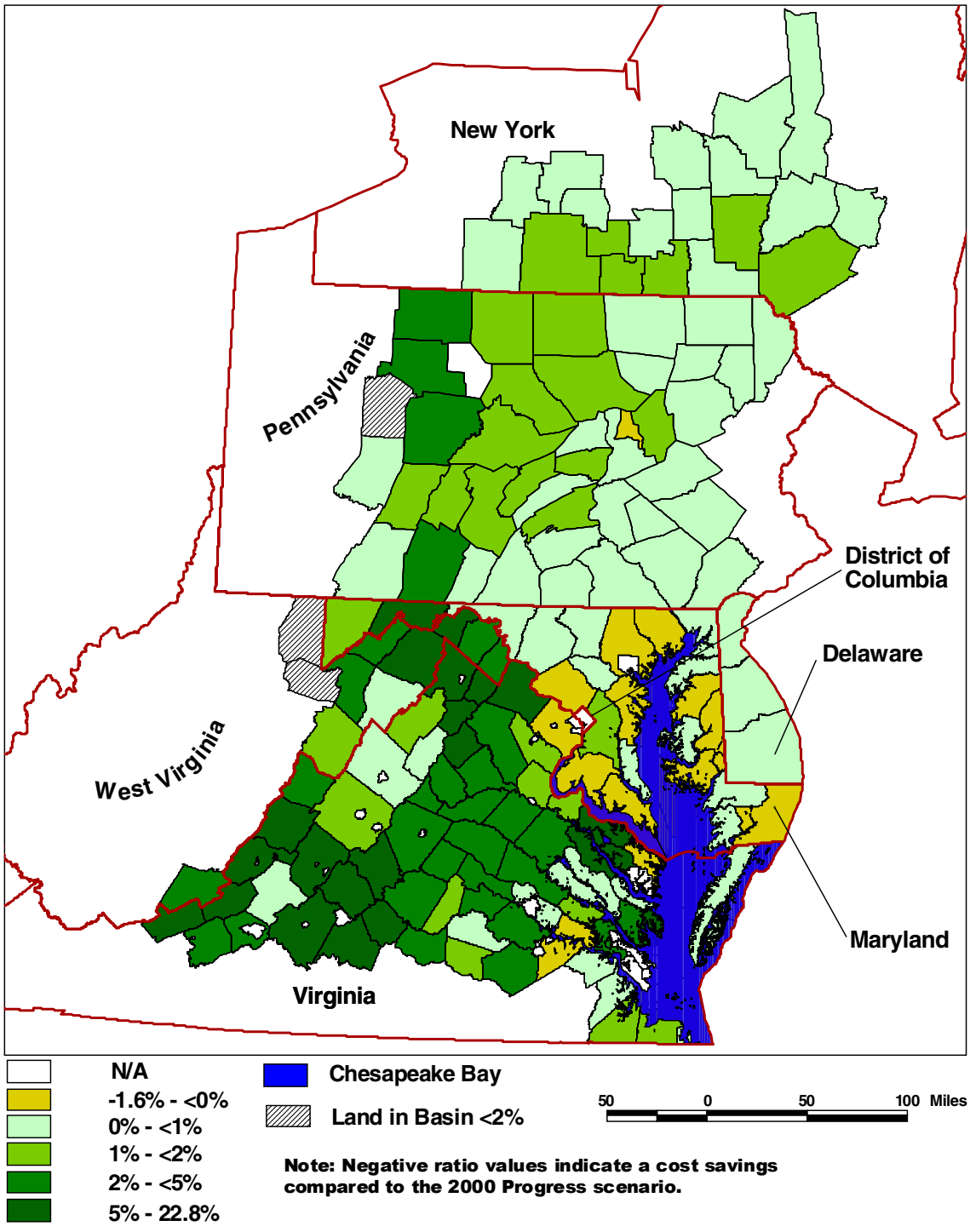

Exhibit H3-5. Comparison of Average Household Urban BMP Costs to Median Household Income: Tier 2 (Urban Screening Variable Values)

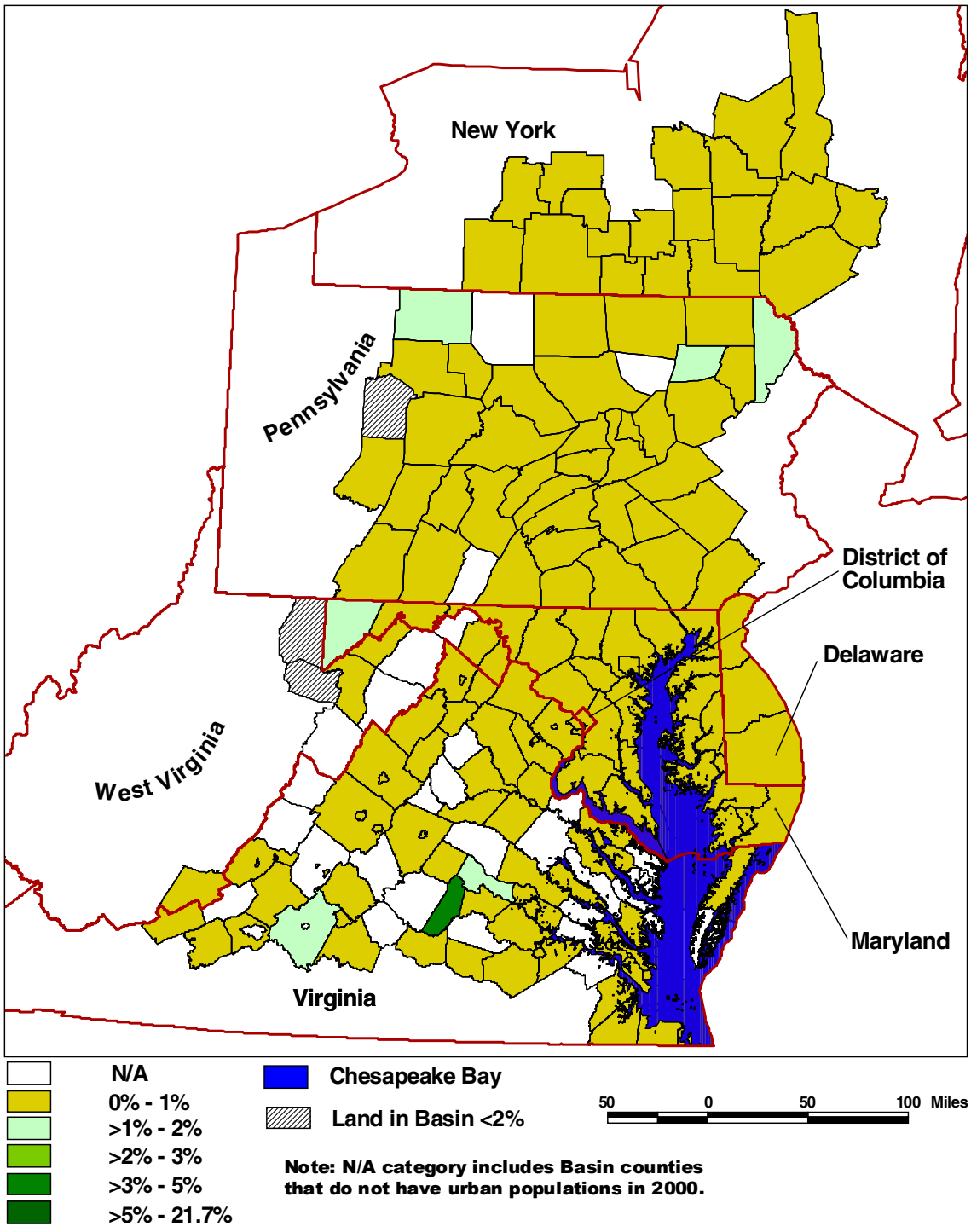

Exhibit H3-6. Comparison of Total Household Sewer Costs Plus Average Household Urban BMP Costs to Median Household Income: Tier 2 (Combined POTW plus Urban BMP Screening Variable Values)